

SHARP SERVICE MANUAL

S3614R3A88PX/

MICROWAVE OVEN



MODEL **R-3A88**

In interests of user-safety the oven should be restored to its original condition and only parts identical to those specified should be used.

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SERVICE MANUAL

SHARP

MICROWAVE OVEN

R-3A88

GENERAL IMPORTANT INFORMATION

This Manual has been prepared to provide Sharp Corp. Service engineers with Operation and Service Information.

It is recommended that service engineers carefully study the entire text of this manual, so they will be qualified to render satisfactory customer service.

CAUTION MICROWAVE RADIATION

DO NOT BECOME EXPOSED TO RADIATION FROM THE MICROWAVE GENERATOR OR OTHER PARTS CONDUCTING MICROWAVE ENERGY.

Service engineers should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating devices if it is improperly used or connected. All input and output microwave connections, waveguides, flanges and gaskets must be secured. Never operate the device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.

WARNING

Never operate the oven until the following points are ensured.

- (A) The door is tightly closed.
- (B) The door brackets and hinges are not defective.
- (C) The door packing is not damaged.
- (D) The door is not deformed or warped.
- (E) There is not any other visible damage with the oven.

Servicing and repair work must be carried out only by trained service engineers.

All the parts marked "*" on parts list are used at voltages more than 250V.

Removal of the outer wrap gives access to potentials above 250V.

All the parts marked "Δ" on parts list may cause undue microwave exposure, by themselves, or when they are damaged, loosened or removed.

SHARP CORPORATION

OSAKA, JAPAN

PRODUCT SPECIFICATIONS

APPEARANCE VIEW

OPERATING SEQUENCE

FUNCTION OF IMPORTANT COMPONENTS

SERVICING AND TROUBLESHOOTING CHART

TEST PROCEDURE

TOUCH CONTROL PANEL ASSEMBLY

COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

MICROWAVE MEASUREMENT

WIRING DIAGRAM

PARTS LIST

PRODUCT SPECIFICATIONS

ITEM	DESCRIPTION
Power Requirements	220 Volts 50 Hertz Single phase, 3 wire earthed
Power Consumption	1.35 kW
Power Output	850 watts nominal of RF microwave energy (IEC 705) Operating frequency 2450 MHz
Case Dimensions	Width 520 mm Height 305 mm Depth 389mm
Cooking Cavity Dimensions	Width 348 mm Height 197 mm Depth 368 mm
Turntable diameter	325mm
Control Complement	Touch Control System Clock (1:00 - 12:59) Timer (0 - 99 minutes 99 seconds) Microwave Power for Variable Cooking Repetition Rate; HIGH Full power throughout the cooking time MEDIUM HIGH approx. 70% of Full Power MEDIUM approx. 50% of Full Power MEDIUM LOW approx. 30% of Full Power LOW approx. 10% of Full Power HELP pad, REHEAT pad RICE COOK pad STEAM MENU pad MORE, LESS pads INTERNATIONAL MENU pads SLOW COOK pad EASY DEFROST pad NUMBER pads, POWER LEVEL pad AUTO START/⌚ pad STOP/CLEAR pad INSTANT COOK/START pad
Set Weight	Approx. 15 kg

GENERAL INFORMATION

WARNING

THIS APPLIANCE MUST BE EARTHED

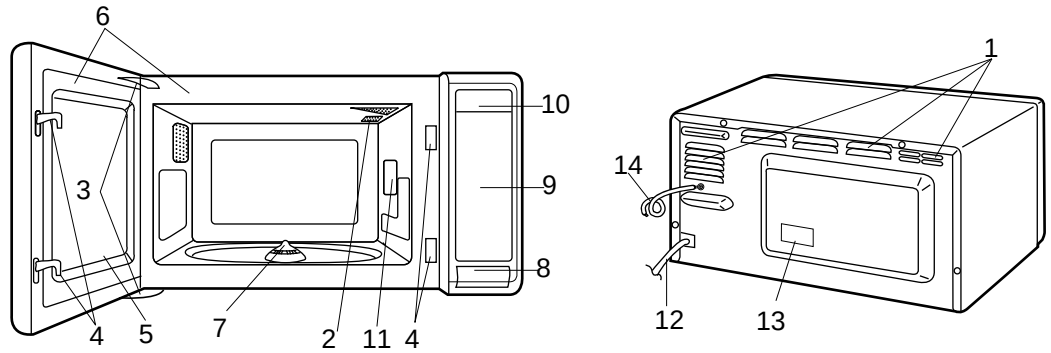
IMPOTANT

THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE:

GREEN-AND-YELLOW	: EARTH
BLUE	: NEUTRAL
BROWN	: LIVE

APPEARANCE VIEW

1. Ventilation openings
2. Oven lamp
3. Door hinges
4. Door safety latches
5. See through door
6. Door seals and sealing surfaces
7. Coupling
8. Door open button
9. Touch control panel
10. Digital readout
11. Wave guide cover
12. Power supply cord
13. Rating label
14. Earth wire



TOUCH CONTROL PANEL

- a** **HELP PAD**
Touch to select child lock, language or demonstration modes.
Touch to get cooking information.

- b** **REHEAT PAD**
Touch to reheat 3 popular menus.

- c** **RICE COOK PAD**
Touch to cook rice, congee or porridge.

- d** **STEAM MENU PAD**
Touch to cook steam menus.

- e** **INTERNATIONAL MENUE OADS**
Touch to cook 3 international menus.

- f** **SLOW COOK PAD**
Touch to cook slowly and longer time.

- g** **EASY DEFROST PAD**
Touch to defrost meat by entering weight.

- h** **MORE (▲), LESS (▼) PADS**
Touch to adjust the doneness of food in one minute increments during cooking or to increase/decrease the time whilst programming the REHEAT, RICE COOK, STEAM MENU, INTERNATIONAL MENU or EASY DEFROST modes.

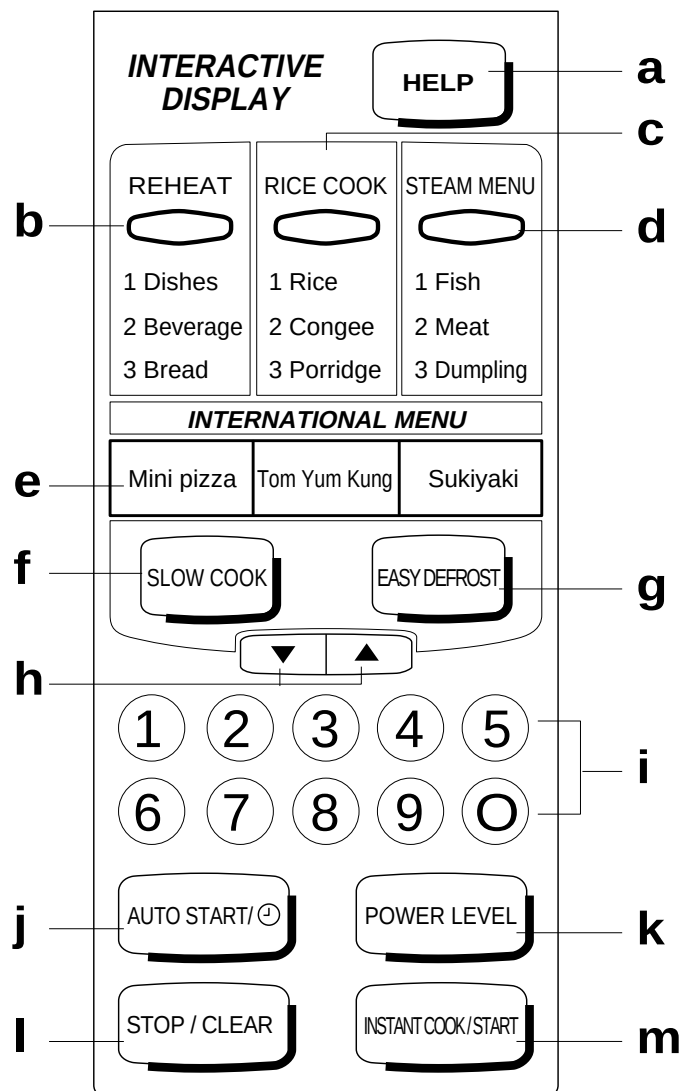
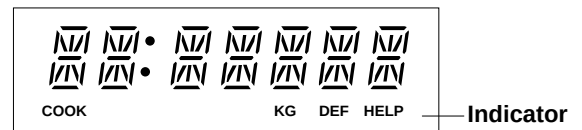
- i** **NUMBER PADS**
Touch to enter cooking times, clock time, weight or quantity of food.

- j** **AUTO START/CLOCK PAD**
Touch to set clock or Auto Start time.

- k** **POWER LEVEL PAD**
Touch to select microwave power setting.
If not touched, HIGH is automatically selected.

- l** **STOP/CLEAR PAD**
Touch to clear during programming.
Touch once to stop operation of oven during cooking; touch twice to cancel cooking programme.

- m** **INSTANT COOK/START PAD**
Touch once to cook for 1 minute at HIGH or increase by 1 minute multiples each time this pad is touched during cooking.
Touch to start oven after setting programmes.



OPERATION SEQUENCE

OFF CONDITION

Closing the door activates all door interlock switches (1st. latch switch and 2nd. interlock relay control switch).

IMPORTANT

When the oven door is closed, the monitor switch contacts (COM-NC) must be open.

When the microwave oven is plugged in a wall outlet, rated voltage is supplied to the point A3+A5 in the control unit.

Figure O-1 on page 25

1. The display shows **SHARP**, **MICRO-**, **WAVE** and **OVEN**.
2. To set any programmes or set the clock, you must first touch the STOP/CLEAR pad.
3. **:** appears in the display.

NOTE: When the oven door is opened, the oven lamp comes on at this time.

MICROWAVE COOKING CONDITION

HIGH COOKING

Enter a desired cooking time with the touching NUMBER pad and start the oven with touching START pad.

Function sequence

Figure O-2 on page 25

CONNECTED COMPONENTS	RELAY
Oven lamp, Fan motor, Turntable motor	RY1
Power transformer	RY2

1. Rated voltage. is supplied to the primary winding of the power transformer. The voltage is converted to about 3.3 volts A.C. output on the filament winding and high voltage of approximately 2000 volts A.C. on the secondary winding.
2. The filament winding voltage (3.3 volts) heats the magnetron filament and the high voltage (2000 volts) is sent to the voltage doubling circuit, where it is doubled to negative voltage of approximately 4000 volts D.C..
3. The 2450 MHz microwave energy produced in the magnetron generates a wave length of 12.24 cm. This energy is channelled through the waveguide (transport channel) into the oven cavity, where the food is placed to be cooked.
4. When the cooking time is up, a signal tone is heard and the relays RY1+RY2 go back to their home position. The circuits to the oven lamp, power transformer, fan motor and turntable motor are cut off.
5. When the door is opened during a cook cycle, the switches come to the following condition

SWITCH	CONTACT	CONDITION	
		DURING COOKING	DOOR OPEN (NO COOKING)
1st. latch switch	COM-NO	Closed	Open
2nd. interlock relay control switch	COM-NO	Closed	Open
Monitor switch	COM-NC	Open	Closed

The circuits to the power transformer, fan motor and turntable motor are cut off when the 1st. latch switch and 2nd. interlock relay control switch are made open. The oven lamp remains on even if the oven door is opened after the cooking cycle has been interrupted, because the relay RY1 stays closed. Shown in the display is the remaining time.

6. MONITOR SWITCH CIRCUIT

The monitor switch is mechanically controlled by oven door, and monitors the operation of the 1st latch switch and 2nd. interlock relay.

- 6-1 When the oven door is opened during or after the cycle of a cooking program, the 1st. latch switch and 2nd. interlock relay control switch must open their contacts first.

After that the contacts (COM-NC) of the monitor switch can be closed.

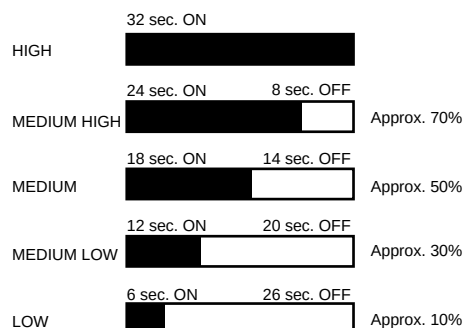
- 6-2. When the oven door is closed, the contacts (COM-NC) of the monitor switch must be opened. After that the contacts of the 1st. latch switch and 2nd. interlock relay control switch are closed.

- 6-3. When the oven door is opened and the contacts of the 1st. latch switch and 2nd. interlock relay remain closed. The fuse M8A will blow, because the monitor switch is closed and a short circuit is caused.

MEDIUM HIGH, MEDIUM, MEDIUM LOW, LOW COOKING

When the microwave oven is preset for variable cooking power, rated voltage is supplied to the power transformer intermittently within a 32-second time base through the relay contact which is coupled with the current-limiting relay. The following levels of microwave power are given.

SETTING;



NOTE: The ON/OFF time ratio does not exactly correspond to the percentage of microwave power, because approx. 2 seconds are needed for heating up the magnetron filament.

FUNCTION OF IMPORTANT COMPONENTS

DOOR OPEN MECHANISM

The door is opened by pushing the open button on the control panel, refer to the Figure D-1.

When the open button is pushed, the open button pushes up the switch lever, and then the switch lever pushes up the latch head. The latch heads are moved upward and released from latch hook. Now the door will open.

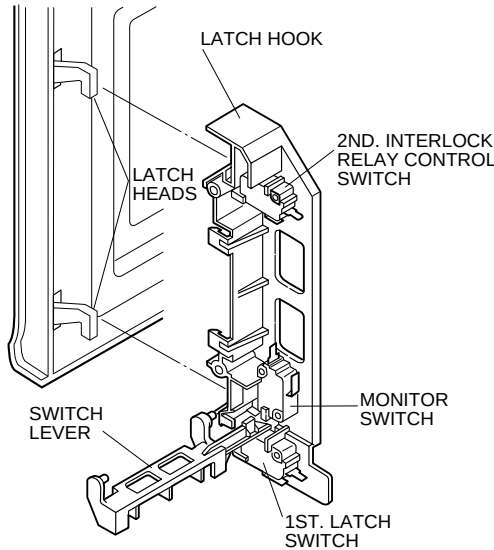


Figure D-1. Door Open Mechanism

1ST. LATCH SWITCH AND 2ND. INTERLOCK RELAY CONTROL SWITCH

1. When the oven door is closed, the contacts (COM-NO) must be closed.
2. When the oven door is opened, the contacts (COM-NO) must be opened.

MONITOR SWITCH

1. When the oven door is closed, the contacts (COM-NC) must be opened.
2. When the oven door is opened, the contacts (COM-NC) must be closed.
3. If the oven door is opened and the contacts (COM-NO) of the 1st. latch switch and 2nd. interlock relay fail to open, the fuse M8A blows simultaneously with closing the contacts (COM-NC) of the monitor switch.

CAUTION: BEFORE REPLACING A BLOWN FUSE M8A TEST THE 1ST. LATCH SWITCH, 2ND. INTERLOCK RELAY, 2ND. INTERLOCK RELAY CONTROL SWITCH, MONITOR SWITCH AND MONITOR RESISTOR FOR PROPER OPERATION.

MONITOR RESISTOR R 0.8Ω 20W

The monitor resistor prevents the fuse M8A bursting when the fuse M8A blows due to the operation of the monitor switch.

FUSE M8A

1. The fuse M8A blows when the contacts (COM-NO) of the 1st. latch switch and 2nd. interlock relay remain closed with the oven door open and when the monitor switch closes.
2. If the wire harness or electrical components are short-circuited, this fuse M8A blows to prevent an electric shock or fire hazard.

THERMAL CUT-OUT TC 145°C (MG)

This thermal cut-out protects the magnetron against overheating. If the temperature goes up higher than 145°C because the fan motor is interrupted, the ventilation openings are blocked, the thermal cut-out will open and the line voltage to the power transformer will be cut off and the operation of the magnetron will be stopped.

The defective thermal cut-out must be replaced with new one.

THERMAL CUT-OUT TC 145°C (OVEN)

The thermal cut-out located on the top of the oven cavity is designed to prevent damage to the oven if the foods in the oven catch fire due to over heating produced by improper setting of cook time or failure of control unit. Under normal operation, the oven thermal cut-out remains closed. However, when abnormally high temperatures are reached within the oven cavity, the oven thermal cut-out will open at 145°C, causing the oven to shut down. The defective thermal cut-out must be replaced with new one.

THERMAL CUT-OUT 95°C (FAN MOTOR)

The thermal cut-out protect the fan motor against overheating. If its temperature goes up higher than 95°C because the fan motor is locked or the ventilation operating are blocked, the contacts of the thermal cut-out will open and switch off the oven. When the oven cools itself down to 75°C, the contacts of the thermal cut-out will close again.

TURNTABLE MOTOR

The turntable motor drives the turntable roller assembly to rotate the turntable.

FAN MOTOR

The fan motor drives a blade which draws external cool air. This cool air is directed through the air vanes surrounding the magnetron and cools the magnetron. This air is channelled through the oven cavity to remove steam and vapours given off from the heating foods. It is then exhausted through the exhausting air vents at the oven cavity.

SERVICING

WARNING TO SERVICE PERSONNEL

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with any part of the high voltage circuit will result in electrocution. High voltage capacitor, Power transformer, Magnetron, High voltage rectifier assembly, High voltage harness.

REMEMBER TO CHECK 3D

- 1) Disconnect the supply.
- 2) Door opened, and wedged open.
- 3) Discharge high voltage capacitor.

WARNING: AGAINST THE CHARGE OF THE HIGH-VOLTAGE CAPACITOR

The high-voltage capacitor remains charged about 60 seconds after the oven has been switched off. Wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is, of the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

Sharp recommend that wherever possible fault-finding is carried out with the supply disconnected. It may in, some cases, be necessary to connect the supply after the outer case has been removed, in this event carry out 3D checks and then disconnect the leads to the primary of the power transformer. Ensure that these leads remain isolated from other components and the oven chassis. (Use insulation tape if necessary.) When the testing is completed carry out 3D checks and reconnect the leads to the primary of the power transformer.

When all service work is completed, and the oven is fully assembled, the microwave power output should be checked and microwave leakage test carried out

REMEMBER TO CHECK 4R

- 1) Reconnect all leads removed from components during testing.
- 2) Replace the outer case (cabinet).
- 3) Reconnect the supply.
- 4) Run the oven. Check all functions.

Microwave ovens should not be run empty. To test for the presence of microwave energy within a cavity, place a cup of cold water on the oven turntable, close the door and set the microwave timer for two (2) minutes. Set the power level to HIGH and push the START button. When the two minutes has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold carry out 3D checks and re-examine the connections to the component being tested.

TROUBLESHOOTING GUIDE

When troubleshooting the microwave oven, it is helpful to follow the Sequence of Operation in performing the checks. Many of the possible causes of trouble will require that a specific test be performed. These tests are given a procedure letter which will be found in the "Test Procedure" section.

IMPORTANT: If the oven becomes inoperative because of a blown fuse M8A in the 1st. latch switch - 2nd. interlock relay - monitor switch - monitor resistor circuit, check the 1st. latch switch, 2nd. interlock relay, 2nd. interlock switch, 2nd. interlock relay control switch, monitor switch and monitor resistor before replacing the fuse M8A.

CK = Check / RE = Replace

TEST PROCEDURE		A	B	C	D	E	E	E	G	F	F	H	H	I	K	L	M	N	RECK	CKRE	CK	CK	CK	CK	CK		
CONDITION	POSSIBLE CAUSE AND DEFECTIVE PARTS PROBLEM	MAGNETRON	POWER TRANSFORMER	H.V. RECTIFIER ASSEMBLY	HIGH VOLTAGE CAPACITOR	1ST. LATCH SWITCH	2ND. INTERLOCK RELAY CONTROL SWITCH	MONITOR SWITCH	MONITOR RESISTOR	THERMAL CUT-OUT 95°C	THERMAL CUT-OUT 145°C	FAN MOTOR	TURNTABLE MOTOR	FUSE M8A	TOUCH CONTROL PANEL	KEY UNIT	RELAY (RY-1, RY-2)	FOIL PATTERN ON P.W.B.	POWER SUPPLY CORD	SHORTED WIRE HARNESS	OPENED WIRE HARNESS	OVEN LAMP OR SOCKET	WALL OUTLET	MISADJUSTMENT SWITCH	HOME FUSE OR BREAKER	BLOCKED COOLING FAN	BLOCKED VENTILATION
OFF CONDITION	Home fuse blows when power supply cord is plugged into wall outlet.																		○	○					○		
	FUSE M8A blows when power supply cord is plugged into wall outlet.							○						○						○				○			
	Display does not show anything when power supply cord is plugged into wall outlet.									○	○			○	○			○	○		○		○		○		
	Display does not operate properly when STOP/CLEAR pad is touched.						○								○	○					○		○				
	Oven lamp does not light at door opened. (Display appears.)						○								○		○			○	○	○					
ON CONDITION	Oven does not start when the START pad is touched. (Display appears)														○	○	○				○			○			
	Oven lamp does not light (Display appears.)														○		○				○	○					
	Fan motor does not operate. (Display appears.)					○						○					○				○			○		○	
	Turntable motor assembly does not operate. (Display appears.)					○							○				○				○			○			
	Oven or any electrical parts does not stop when cooking time is 0 or STOP/CLEAR pad is touched.														○		○										
	Oven seems to be operating but little or no heat is produced in oven load. (Microwave power level is set at HIGH)	○	○	○	○										○		○					○					
	Oven does not seems to be operating properly when MEDIUM HIGH, MEDIUM, MEDIUM LOW or LOW is set. (Oven operates properly at HIGH and when the STOP/CLEAR pad is touched the oven stops.)														○		○										
	Oven goes into cook cycle but shuts down before end of cooking cycle.										○	○			○										○	○	
	Oven stops as soon as the START pad is touched.	○	○	○	○										○												

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST
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A	MAGNETRON TEST
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NEVER TOUCH ANY PART IN THE CIRCUIT WITH YOUR HAND OR AN INSULATED TOOL WHILE THE OVEN IS IN OPERATION.
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CARRY OUT 3D CHECK.

Isolate the magnetron from high voltage circuit by removing all leads connected to filament terminal.

To test for an open circuit filament use an ohmmeter to make a continuity test between the magnetron filament terminals, the meter should show a reading of less than 1 ohm.

To test for short filament to anode condition, connect ohmmeter between one of the filament terminals and the case of the magnetron (ground). This test should be indicated an infinite resistance. If a low or zero resistance reading is obtained then the magnetron should be replaced.

MICROWAVE OUTPUT POWER (IEC 705)

The following test procedure should be carried out with the microwave oven in a fully assembled condition (outer case fitted). Microwave output power from the magnetron can be measured by way of IEC 705, i.e. it can be measured by using water load how much it can be absorbed by the water load. To measure the microwave output power in the microwave oven, the relation of calorie and watt is used. When P(W) heating works for t(second), approximately $P \times t / 4.187$ calorie is generated. On the other hand, if the temperature of the water with V(ml) rises ΔT (°C) during this microwave heating period, the calorie of the water is $V \times \Delta T$.

The formula is as follows;

$$P \times t / 4.187 = V \times \Delta T \quad P (W) = 4.187 \times V \times \Delta T / t$$

Our condition for water load is as follows:

Room temperature.....around 20°C	Power supply Voltage.....Rated voltage
Water load.....1000 g	Initial temperature.....10±2°C
	Heating time.....49 sec.
$P = 85 \times \Delta T$	

Measuring condition:

- Container
The water container must be a cylindrical borosilicate glass vessel having a maximum material thickness of 3 mm and an outside diameter of approximately 190 mm.
- Temperature of the oven and vessel
The oven and the empty vessel are at ambient temperature prior to the start the test.
- Temperature of the water
The initial temperature of the water is (10±2)°C.
- Select the initial and final water temperature so that the maximum difference between the final water temperature and the ambient temperature is 5°C.
- Select stirring devices and measuring instruments in order to minimize addition or removal of heat.
- The graduation of the thermometer must be scaled by 0.1°C at minimum and accurate thermometer.
- The water load must be (1000±5) g.
- "t" is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included.

NOTE: The operation time of the microwave oven is "t + 2" sec. 2 sec. is magnetron filament heat-up time.

Measuring method:

- Measure the initial temperature of the water before the water is added to the vessel.
(Example: The initial temperature $T_1 = 11^\circ\text{C}$)
- Add the 1 litre water to the vessel.
- Place the load on the centre of the shelf.
- Operate the microwave oven at HIGH for the temperature of the water rises by a value ΔT of (10 ± 2)°C.
- Stir the water to equalize temperature throughout the vessel.

TEST PROCEDURES

PROCEDURE
LETTER

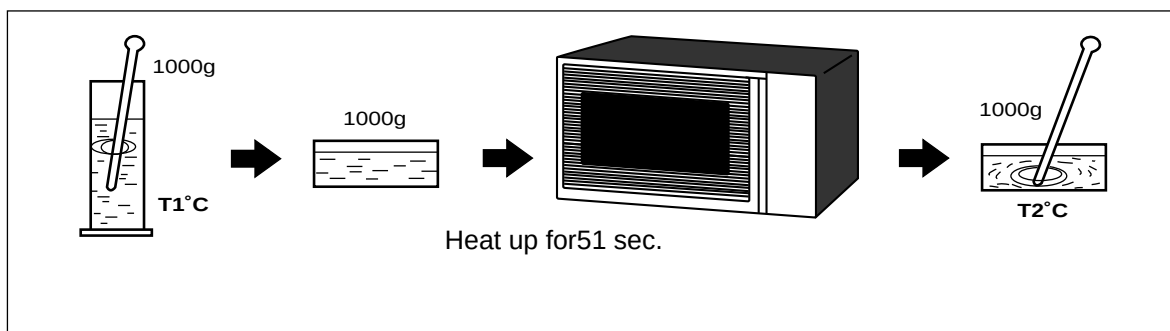
COMPONENT TEST

6. Measure the final water temperature. (Example: The final temperature $T_2 = 21^\circ\text{C}$)
 7. Calculate the microwave power output P in watts from above formula.

Initial temperature $T_1 = 11^\circ\text{C}$
 Temperature after $(49 + 2) = 51$ sec. $T_2 = 21^\circ\text{C}$
 Temperature difference Cold-Warm..... $\Delta T_1 = 10^\circ\text{C}$
 Measured output power
 The equation is " $P = 85 \times \Delta T$ " $P = 85 \times 10^\circ\text{C} = 850$ Watts

JUDGMENT: The measured output power should be at least $\pm 15\%$ of the rated output power.

CAUTION: 1°C CORRESPONDS TO 85 WATTS REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.



B

POWER TRANSFORMER TEST

WARNING: High voltages and large currents are present at the secondary winding and filament winding of the power transformer. It is very dangerous to work near this part when the oven is on. NEVER make any voltage measurements of the high-voltage circuits, including the magnetron filament.

CARRY OUT 3D CHECKS.

Disconnect the leads to the primary winding of the power transformer. Disconnect the filament and secondary winding connections from the rest of the HV circuitry. Using an ohmmeter, set on a low range, it is possible to check the continuity of all three windings. The following readings should be obtained:

- a. Primary winding approx. $1.4\ \Omega$
- b. Secondary winding approx. $98\ \Omega$
- c. Filament winding less than $1\ \Omega$

If the reading obtained are not stated as above, then the power transformer is probably faulty and should be replaced.

CARRY OUT 4R CHECKS.

C

HIGH VOLTAGE RECTIFIER ASSEMBLY TEST**HIGH VOLTAGE RECTIFIER TEST**

CARRY OUT 3D CHECKS.

Isolate the high voltage rectifier assembly from the HV circuit. The high voltage rectifier can be tested using an ohmmeter set to its highest range. Connect the ohmmeter across the terminal B+C of the high voltage rectifier and note the reading obtained. Reverse the meter leads and note this second reading. The normal resistance is infinite in one direction and more than $100\ \text{k}\Omega$ in the other direction.

TEST PROCEDURES (CONT'D)

PROCEDURE
LETTER

COMPONENT TEST



CARRY OUT 4R CHECKS.

NOTE: FOR MEASUREMENT OF THE RESISTANCE OF THE RECTIFIER, THE BATTERIES OF THE MEASURING INSTRUMENT MUST HAVE A VOLTAGE AT LEAST 6 VOLTS, BECAUSE OTHERWISE AN INFINITE RESISTANCE MIGHT BE SHOWN IN BOTH DIRECTIONS.

D HIGH VOLTAGE CAPACITOR TEST

CARRY OUT 3D CHECKS.

- A. Isolate the high voltage capacitor from the circuit.
- B. Continuity check must be carried out with measuring instrument which is set to the highest resistance range.
- C. A normal capacitor shows continuity for a short time (kick) and then a resistance of about 10MΩ after it has been charged.
- D. A short-circuited capacitor shows continuity all the time.
- E. An open capacitor constantly shows a resistance about 10 MΩ because of its internal 10MΩ resistance.
- F. When the internal wire is opened in the high voltage capacitor shows an infinite resistance.
- G. The resistance across all the terminals and the chassis must be infinite when the capacitor is normal. If incorrect reading are obtained, the high voltage capacitor must be replaced.

CARRY OUT 4R CHECKS.

E SWITCH TEST

CARRY OUT 3D CHECKS.

Isolate the switch to be tested and using an ohmmeter check between the terminals as described in the following table.

Table: Terminal Connection of Switch

Plunger Operation	COM to NO	COM to NC
Released	O.C.	S.C.
Depressed	S.C.	O.C.

COM; Common terminal,
NO; Normally open terminal
NC; Normally close terminal
S.C.; Short,
O.C.; Open circuit

If incorrect readings are obtained, make the necessary switch adjustment or replace the switch.

CARRY OUT 4R CHECKS.

F THERMAL CUT-OUT TEST

CARRY OUT 3D CHECKS.

Disconnect the leads from the terminals of the thermal cut-out. Then using an ohmmeter, make a continuity test across the two terminals as described in the table below.

CARRY OUT 4R CHECKS

Table: Thermal cut-out Test

Parts Name	Temperature of "ON" condition (closed circuit) (°C)	Temperature of "OFF" condition (open circuit) (°C)	Indication of ohmmeter (When room temperature is approx. 20°C)
Thermal cut-out 145°C	This is not resetable type	Above 145°C	Closed circuit.
Thermal cut-out 95°C	Below 75°C	Above 95°C	Closed circuit.

If incorrect readings are obtained, replace the thermal cut-out.

An open circuit thermal cut-out 145°C (MG) indicates that the magnetron has overheated, this may be due to restricted ventilation, cooling fan failure or a fault condition within the magnetron or HV circuit.

An open circuit thermal cut-out 145°C (OVEN) indicates that the foods in the oven may catch fire, this may be due to over heating produced by improper setting of the cooking time or failure of the control panel.

An open circuit thermal cut-out 95°C (FAN) indicates that the fan motor winding has overheated, this may be due to blocked ventilation or locked cooling fan.

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST						
G	<u>MONITOR RESISTOR TEST</u> CARRY OUT <u>3D</u> CHECKS. Disconnect the leads from the monitor resist. Using an ohmmeter and set on a low range. Check between the terminals of the monitor resistor. The resistance of monitor resistor is approx. 0.8 ohms. If incorrect readings are obtained, replace the monitor resistor. CARRY OUT <u>4R</u> CHECKS.						
H	<u>MOTOR WINDING TEST</u> CARRY OUT <u>3D</u> CHECKS. Disconnect the leads from the motor. Using an ohmmeter, check the resistance between the two terminals as described in the table below. Table: Resistance of Motor <table border="1"> <tr> <th>Motors</th><th>Resistance</th></tr> <tr> <td>Fan motor</td><td>Approximately 370 Ω</td></tr> <tr> <td>Turntable motor</td><td>Approximately 16.08 kΩ</td></tr> </table> If incorrect readings are obtained, replace the motor. CARRY OUT <u>4R</u> CHECKS	Motors	Resistance	Fan motor	Approximately 370 Ω	Turntable motor	Approximately 16.08 k Ω
Motors	Resistance						
Fan motor	Approximately 370 Ω						
Turntable motor	Approximately 16.08 k Ω						
I	<u>BLOWN FUSE F M8A</u> CARRY OUT <u>3D</u> CHECKS. - If the fuse M8A is blown, there could be shorts or ground in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness. - If the fuse M8A is blown when the door is opened, check the 1st. latch switch, 2nd. interlock relay, 2nd. interlock relay control switch, monitor switch and monitor resistor. If the fuse M8A is blown by incorrect door switching replace the defective switch(s) and the fuse M8A. CARRY OUT <u>4R</u> CHECKS. CAUTION: ONLY REPLACE FUSE M8A WITH THE CORRECT VALUE REPLACEMENT.						
J	<u>TOUCH CONTROL PANEL ASSEMBLY TEST</u> The touch control panel consists of circuits including semiconductors such as LSI, ICs, etc. Therefore, unlike conventional microwave ovens, proper maintenance cannot be performed with only a voltmeter and ohmmeter. In this service manual, the touch control panel assembly is divided into two units, Control Unit and Key Unit, and troubleshooting by replacement is described according to the symptoms indicated. - Key Unit Note : Check key unit ribbon connection before replacement. The following symptoms indicate a defective key unit. Replace the key unit. - When touching the pads, a certain pad produces no signal at all. - When touching a number pad, two figures or more are displayed. - When touching the pads, sometimes a pad produces no signal. - Control Panel The following symptoms indicate a defective control unit. Before replacing the control unit, perform the Key unit test (Procedure K) to determine if control unit is faulty. - In connection with pads. - When touching the pads, a certain group of pads do not produce a signal. - When touching the pads, no pads produce a signal.						

TEST PROCEDURES (CONT'D)

PROCEDURE
LETTER

COMPONENT TEST

2-2 In connection with indicators

- a) At a certain digit, all or some segments do not light up.
- b) At a certain digit, brightness is low.
- c) Only one indicator does not light.
- d) The corresponding segments of all digits do not light up; or they continue to light up.
- e) Wrong figure appears.
- f) A certain group of indicators do not light up.
- g) The figure of all digits flicker.

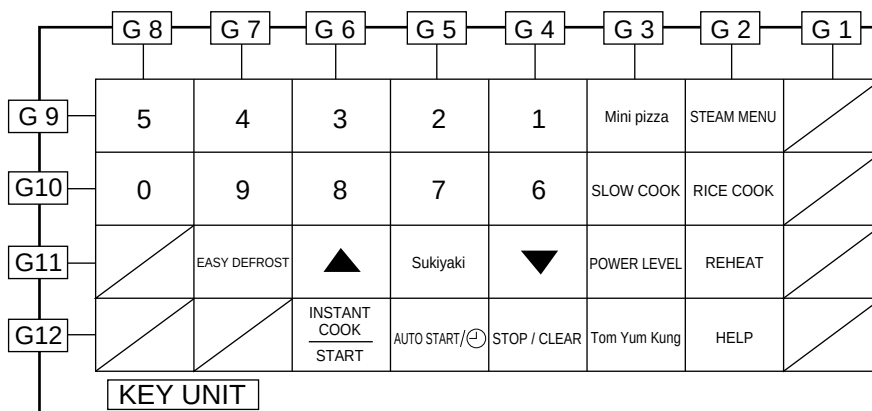
2-3 Other possible troubles caused by defective control unit.

- a) Buzzer does not sound or continues to sound.
- b) Clock does not operate properly.
- c) Cooking is not possible.

K

KEY UNIT TEST

If the display fails to clear when the STOP/CLEAR pad is depressed, first verify the flat ribbon is marking good contact, verify that the door sensing switch (stop switch) operates properly; that is the contacts are closed when the door is closed and open when the door is open. If the door sensing switch (stop switch) is good, disconnect the flat ribbon cable that connects the key unit to the control unit and make sure the door sensing switch is closed (either close the door or short the door sensing switch connector). Use the Key unit matrix indicated on the control panel schematic and place a jumper wire between the pins that correspond to the STOP/CLEAR pad marking momentary contact. If the control unit responds by clearing with a beep the key unit is faulty and must be replaced. If the control unit does not respond, it is faulty and must be replaced. If a specific pad does not respond, the above method may be used (after clearing the control unit) to determine if the control unit or key pad is at fault.



L

RELAY TEST

CARRY OUT 3D CHECKS.

Remove the outer case and check the voltage between Pin Nos. 3 and 5 of the 3 pin connector (A) on the control unit with an A.C. voltmeter.

The meter should indicate 220 volts, if not check oven circuit.

RY1 and RY2 Relay Test

These relays are operated by D.C. voltage.

Check voltage at the relay coil with a D.C. voltmeter during the microwave cooking operation.

DC. voltage indicated Defective relay.

DC. voltage not indicated Check diode which is connected to the relay coil. If diode is good, control unit is defective.

TEST PROCEDURES (CONT'D)

PROCEDURE
LETTER

COMPONENT TEST

RELAY SYMBOL	OPERATIONAL VOLTAGE	CONNECTED COMPONENTS
RY1	APPROX. 25.0V D.C.	Oven lamp / Turntable motor / Cooling fan motor
RY2	APPROX. 25.0V D.C.	Power transformer

CARRY OUT 4R CHECKS.

N

PROCEDURES TO BE TAKEN WHEN THE FOIL PATTERN ON THE PRINTED WIRING BOARD (PWB) IS OPEN

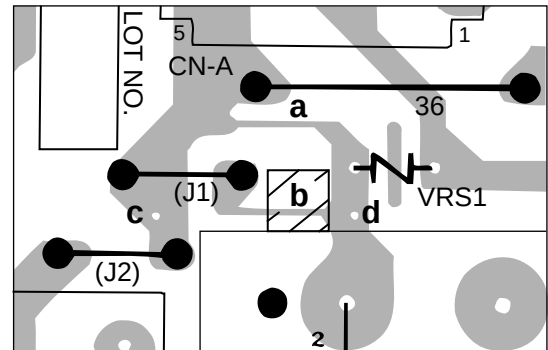
To protect the electronic circuits, this model is provided with a fine foil pattern added to the primary on the PWB, this foil pattern acts as a fuse. If the foil pattern is open, follow the troubleshooting guide given below for repair.

Problem: POWER ON, indicator does not light up.

CARRY OUT 3D CHECKS.

STEPS	OCCURANCE	CAUSE OR CORRECTION
1	The rated AC voltage is not present at POWER terminal of CPU connector (CN-A).	Check supply voltage and oven power cord.
2	The rated AC voltage is present at primary side of low voltage transformer.	Low voltage transformer or secondary circuit defective. Check and repair.
3	Only pattern at "a" is broken.	*Insert jumper wire J1 and solder. (CARRY OUT <u>3D</u> CHECKS BEFORE REPAIR)
4	Pattern at "a" and "b" are broken.	*Insert the coil RCILF2003YAZZ between "c" and "d". (CARRY OUT <u>3D</u> CHECKS BEFORE REPAIR)

NOTE: *At the time of making these repairs, make a visual inspection of the varistor. check for burned damage and examine the transformer with a tester for the presence of layer short-circuit (check primary coil resistance). If any abnormal condition is detected, replace the defective parts.



CARRY OUT 4R CHECKS.

TOUCH CONTROL PANEL ASSEMBLY

OUTLINE OF TOUCH CONTROL PANEL

The touch control section consists of the following units as shown in the touch control panel circuit.

- (1) Key Unit
- (2) Control Unit

The principal functions of these units and the signals communicated among them are explained below.

Key Unit

The key unit is composed of a matrix, signals generated in the LSI are sent to the key unit through R10, R11, R12, R13, R20, R21 and R22.

When a key pad is touched, a signal is completed through the key unit and passed back to the LSI through R00, R01, R02 and R03 to perform the function that was requested.

Control Unit

Control unit consists of LSI, power source circuit, synchronizing signal circuit, ACL circuit, buzzer circuit and indicator circuit.

1) LSI

This LSI controls the key strobe signal, relay driving signal for oven function and indicator signal.

2) Power Source Circuit

This circuit generates voltages necessary in the control unit.

Symbol	Voltage	Application
VC	-5V	LSI(IC1)
VP	-34V	Fluorescent display tube : Grid and anode voltage
VF1	2.2Vac	Filament of fluorescent display tube
VF2		(VF1 to VF2 voltage)

3) Synchronizing Signal Circuit

The power source synchronizing signal is available in order to compose a basic standard time in the clock circuit. It accompanies a very small error because it works on commercial frequency.

4) ACL Circuit

A circuit to generate a signals which resets the LSI to the initial state when power is supplied.

5) Buzzer Circuit

The buzzer is responsive to signals from the LSI to emit audible sounds (key touch sound and completion sound).

6) Door Sensing Switch

A switch to "tell" the LSI if the door is open or closed.

7) Relay Circuit

To drive the magnetron, fan motor, turntable motor and light the oven lamp.

8) Indicator Circuit

Indicator element is a Fluorescent Display.

Basically, a Fluorescent Display is triode having a cathode, a grid and an anode. Usually, the cathode of a Fluorescent Display is directly heated and the filament serves as cathode.

The Fluorescent Display has 7-digits, 15-segments are used for displaying figures.

DESCRIPTION OF LSI

LSI(IZA683DR)

The I/O signal of the LSI(IZA683DR) are detailed in the following table.

Pin No.	Signal	I/O	Description
1	Vdisp	IN	Anode (segment) of Fluorescent Display light-up voltage: -34V Vp voltage of power source circuit input.
2	R00	IN	Signal coming from touch key. When either one of G12 line keys on key matrix is touched, a corresponding signal out of R10 - R13, R20, R21 and R22 will be input into R00. When no key is touched, the signal is held at "L" level.
3	R01	IN	Signal coming from touch key. When either one of G11 line keys on key matrix is touched, a corresponding signal out of R10 - R13, R20, R21 and R22 will be input into R01. When no key is touched, the signal is held at "L" level.
4	R02	IN	Signal coming from touch key. When either one of G10 line keys on key matrix is touched, a corresponding signal out of R10 - R13, R20, R21 and R22 will be input into R02. When no key is touched, the signal is held at "L" level.
5	R03	IN	Signal coming from touch key. When either one of G9 line keys on key matrix is touched, a corresponding signal out of R10 - R13, R20, R21 and R22 will be input into R03. When no key is touched, the signal is held at "L" level.
6	TEST	IN	Connected to VC.
7	RESET	IN	Auto clear terminal. Signal is input to reset the LSI to the initial state when power is applied. Temporarily set to "L" level the moment power is applied, at this time the LSI is reset. Thereafter set at "H" level.
8	OSC1	IN	Internal clock oscillation frequency input setting. The internal clock frequency is set by inserting the ceramic filter oscillation circuit with respect to OSC1 terminal.
9	OSC2	OUT	Internal clock oscillation frequency control output. Output to control oscillation input of OSC2.
10/11	GND/AVSS	IN/IN	Connected to VC.
12	AN0	IN	Input signal which communicates the door open/close information to LSI. Door closed; "H" level signal. Door open; "L" level signal.
13-14	AN1-AN2	IN	Terminal to change cooking constant.
15	R33	OUT	Oven lamp, turntable motor and cooling fan motor driving signal. (Square Waveform : 50Hz) To turn on and off shut-off relay. The square (50Hz) is delivered to the relay driving circuit and cook relay control circuit.
16	P40	OUT	Magnetron high-voltage circuit driving signal. To turn on and off the cook relay. In 100% power operation, the signals holds "L" level during microwave cooking and "H" level while not cooking. In other cooking modes (10%, 30%, 50%, 70% power) the signal turns to "H" level and "L" level in repetition according to the power level.
17-19	R41-R43	OUT	Segment data signal. Refer to the touch control panel circuit for the relationship between signals and indicators. Normally, one pulse is output in every synchronized signal period, and input to the anode of the fluorescent display.
20/21	AVCC/VCC	IN/IN	Connected to GND.
22	INT	IN	Signal to synchronized with commercial source frequency(50Hz). This is basic timing for time processing of LSI.
23-24	D1-D2	OUT	Segment data signal. Refer to the touch control panel circuit for the relationship between signals and indicators. Normally, one pulse is output in every synchronized signal period, and input to the anode of the fluorescent display.

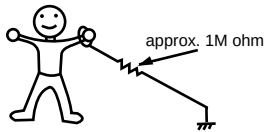
Pin No.	Signal	I/O	Description
25	BUZZ	OUT	<u>Signal to sound buzzer.</u> A: key touch sound (0.12 sec.). B: Completion sound (2.4 sec.).
26-27	D4-D5	OUT	<u>Segment data signal.</u> Refer to the touch control panel circuit for the relationship between signals and indicators. Normally, one pulse is output in every synchronized signal period, and input to the anode of the fluorescent display.
28	D6	OUT	<u>Segment data signal.</u> Signal similar to P41.
			<u>Key strobe signal.</u> Signal applied to touch-key section. A pulse signal is input to R00-R03 terminal while one of G8 line keys on key matrix is touched.
29-30	D7-D8	OUT	<u>Digit selection signal.</u> Refer to the touch control panel circuit about the relation between signals and digits. Normally, one pulse is output in every synchronized signal period, and input to the grid of the fluorescent display.
31-34	R80-R83	OUT	<u>Digit selection signal.</u> Refer to the touch control panel circuit about the relation between signals and digits. Normally, one pulse is output in every synchronized signal period, and input to the grid of the fluorescent display.
35	R10	OUT	<u>Digit selection signal.</u> Refer to the touch control panel circuit about the relation between signals and digits. Normally, one pulse is output in every synchronized signal period, and input to the grid of the fluorescent display.
36	R11	OUT	<u>Segment data signal.</u> Signal similar to P41. <u>Key strobe signal.</u> Signal applied to touch-key section. A pulse signal is input to R00-R03 terminal while one of G7 line keys on key matrix is touched.
37	R12	OUT	<u>Segment data signal.</u> Signal similar to P41. <u>Key strobe signal.</u> Signal applied to touch-key section. A pulse signal is input to R00-R03 terminal while one of G6 line keys on key matrix is touched.
38	R13	OUT	<u>Segment data signal.</u> Signal similar to P41. <u>Key strobe signal.</u> Signal applied to touch-key section. A pulse signal is input to R00-R03 terminal while one of G5 line keys on key matrix is touched.
39	R20	OUT	<u>Segment data signal.</u> Signal similar to P41. <u>Key strobe signal.</u> Signal applied to touch-key section. A pulse signal is input to R00-R03 terminal while one of G4 line keys on key matrix is touched.
40	R21	OUT	<u>Segment data signal.</u> Signal similar to P41. <u>Key strobe signal.</u> Signal applied to touch-key section. A pulse signal is input to R00-R03 terminal while one of G3 line keys on key matrix is touched.
41	R22	OUT	<u>Segment data signal.</u> Signal similar to P41. <u>Key strobe signal.</u> Signal applied to touch-key section. A pulse signal is input to R00-R03 terminal while one of G2 line keys on key matrix is touched.
42	R23	OUT	<u>Segment data signal.</u> Signal similar to P41.

SERVICING

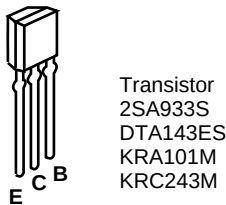
1. Precautions for Handling Electronic Components

This unit uses CMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed. CMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source, static electricity charge in clothes, etc. and sometimes it is not fully protected by the built-in protection circuit. In order to protect CMOS LSI.

- 1) When storing and transporting, thoroughly wrap them in aluminium foil. Also wrap all PW boards containing them in aluminium foil.
- 2) When soldering, ground the technician as shown in the figure and use grounded soldering iron and work table.



2. Shapes of Electronic Components



3. Servicing of Touch Control Panel

We describe the procedures to permit servicing of the touch control panel of the microwave oven and the precautions you must take when doing so. To perform the servicing, power supply to the touch control panel is available either from the power line of the oven itself or from an external power source.

(1) Servicing the touch control panel with power supply of the oven:

CAUTION:

THE HIGH VOLTAGE TRANSFORMER OF THE MICROWAVE OVEN IS STILL LIVE DURING SERVICING PRESENTS A HAZARD.

Therefore, when checking the performance of the touch control panel, put the outer cabinet on the oven to avoid touching the high voltage transformer, or unplug the primary terminal (connector) of the high voltage transformer to turn it off; and the end of such connector must be insulated with an insulating tape. After servicing, be sure to replace the leads to their original locations.

- A. On some models, the power supply cord between the touch control panel and the oven itself is so short that the two can't be separated. For those models, check and repair all the controls (sensor-related ones included) of the touch control panel while keeping it connected to the oven.
- B. On some models, the power supply cord between the touch control panel and the oven proper is long enough that they may be separated from each other. For those models, therefore, it is possible to check and repair the controls of the touch control panel while keeping it apart from the oven proper; in this case you must short both ends of the door sensing switch (on PWB) of the touch control panel with a

jumper, which brings about an operational state that is equivalent to the oven door being closed. As for the sensor-related controls of the touch control panel, checking them is possible if dummy resistor(s) with resistance is equal to that of the controls are used.

(2) Servicing the touch control panel with power supply from an external power source:

Disconnect the touch control panel completely from the oven proper, and short both ends of the door sensing switch (on PWB) of the touch control panel, which brings about an operational state that is equivalent to the oven door being closed. Connect an external power source to the power input terminal of the touch control panel, then it is possible to check and repair the controls of the touch control panel it is also possible to check the sensor-related controls of the touch control panel by using the dummy resistor(s).

4. Servicing Tools

Tools required to service the touch control panel assembly.

- 1) Soldering iron: 30W
(It is recommended to use a soldering iron with a grounding terminal.)
- 2) Oscilloscope: Single beam, frequency range: DC-10MHz type or more advanced model.
- 3) Others: Hand tools

5. Other Precautions

- 1) Before turning on the power source of the control unit, remove the aluminium foil applied for preventing static electricity.
- 2) After aluminium foil is removed, be careful that abnormal voltage due to static electricity etc. is not applied to the input or output terminals.
- 3) Attach connectors, electrolytic capacitors, etc. to PWB, making sure that all connections are tight.
- 4) Be sure to use specified components where high precision is required.

COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

WARNING: Avoid possible exposure to microwave energy. Please follow the instructions below before operating the oven.

1. Disconnect oven from power supply.
2. Make sure that a definite "click" can be heard when the microwave oven door is unlatched. (Hold the door in a closed position with one hand, then push the door open button with the other, this causes the latch leads to rise, it is then possible to hear a "click" as the door switches operate.)
3. Visually check the door and cavity face plate for damage (dents, cracks, signs of arcing etc.).

Carry out any remedial work that is necessary before operating the oven.

Do not operate the oven if any of the following conditions exist;

Please refer to 'OVEN PARTS, CABINET PARTS, CONTROL PANEL PARTS, DOOR PARTS', when carrying out any of the following removal procedures:

1. Door does not close firmly.
2. Door hinge, support or latch hook is damaged.
3. The door gasket or seal or damaged.
4. The door is bent or warped.
5. There are defective parts in the door interlock system.
6. There are defective parts in the microwave generating and transmission assembly.
7. There is visible damage to the oven.

Do not operate the oven:

1. Without the RF gasket (Magnetron).
2. If the wave guide or oven cavity are not intact.
3. If the door is not closed.
4. If the outer case (cabinet) is not fitted.

OUTER CASE REMOVAL

To remove the outer case proceed as follows.

1. Disconnect oven from power supply.
2. Open the oven door and wedge it open.
3. Remove the six (6) screws from rear and along the right side edge of case.
4. Slide the entire case back about 3cm to free it from retaining clips on the cavity face plate.
5. Lift the entire case from the unit.

6. Discharge the H.V. capacitor before carrying out any further work.
 7. Do not operate the oven with the outer case removed.
- N.B.; Step 1, 2 and 7 form the basis of the 3D checks.

CAUTION: DISCHARGE HIGH VOLTAGE CAPACITOR BEFORE TOUCHING ANY OVEN COMPONENT OR WIRING.

MAGNETRON REMOVAL

Removal

1. CARRY OUT 3D CHECKS.
2. Disconnect wire leads from magnetron.
3. Remove the two (2) screws holding chassis support to oven cavity front plate and magnetron.
4. Remove the chassis support from oven.
5. Carefully remove the two (2) screws holding magnetron to waveguide flange.
6. Lift up magnetron with care so that magnetron antenna is not hit by any metal object around antenna.
7. Now, the magnetron is free.

Re-install

1. Re-install the magnetron to waveguide flange with the two (2) screws diagonally as shown in Figure C-1.
2. Re-install the chassis support to oven cavity front plate and magnetron with the two (2) screws.
3. Reconnect the wire leads to the magnetron. Refer to "PICTORIAL DIAGRAM".

4. Re-install outer case and check that the oven is operating properly.

CAUTION: WHEN REPLACING MAGNETRON, BE SURE THE R.F. GASKET IS IN PLACE AND MOUNTING SCREWS ARE TIGHTENED SECURELY

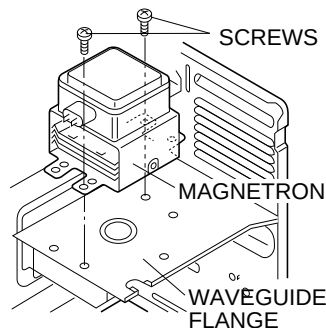


Figure C-1. Magnetron replacement

POWER TRANSFORMER REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect wire leads from power transformer,

magnetron and capacitor terminals.

3. Remove four (4) screws holding transformer to bottom

plate right.

4. Remove transformer from bottom plate right.
5. Remove the one (1) terminal insulator from filament lead (longer one) of power transformer.

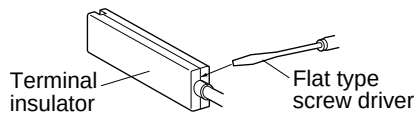
Re-install

1. Insert tube into filament lead (longer one) of power transformer.
2. Install the terminal insulator to receptacle of filament lead (longer one) of power transformer.

3. Rest transformer on the bottom plate right with its primary terminals toward the oven face plate.
4. Secure transformer with four screws to bottom plate right.
5. Re-connect wire leads (primary and high voltage) to power transformer and filament leads of transformer to magnetron and high voltage capacitor. Refer to "PICTORIAL DIAGRAM".
6. Re-install outer case and check that oven is operating properly.

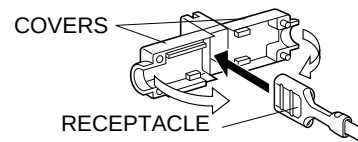
TERMINAL INSULATOR REPLACEMENT

1. Open covers of the terminal insulator by using small flat type screw driver.
2. Remove the receptacle from the terminal insulator.
3. Now, the terminal insulator is free.



Installation

1. Insert the receptacle into terminal insulator.
2. Close covers of the terminal insulator, as shown illustrated below.



HIGH VOLTAGE RECTIFIER AND HIGH VOLTAGE CAPACITOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the high voltage wire of the high voltage rectifier assembly from the magnetron.
3. Remove one (1) screw holding capacitor holder to oven cavity rear plate.
4. Remove one (1) screw holding high voltage rectifier assembly to capacitor holder.
5. Disconnect rectifier terminal from capacitor.
6. Now, high voltage rectifier assembly is free.

7. Disconnect wire leads from capacitor and remove capacitor holder.
8. Now, high voltage capacitor is free.

CAUTION: WHEN REPLACING HIGH VOLTAGE RECTIFIER AND HIGH VOLTAGE CAPACITOR, GROUND SIDE TERMINAL OF THE HIGH VOLTAGE RECTIFIER MUST BE SECURED FIRMLY WITH A GROUNDING SCREW.

POSITIVE LOCK® CONNECTOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Pushing the lever of positive lock® connector.
3. Pull out the positive lock® connector.

CAUTION: WHEN YOU (SERVICE ENGINEERS) CONNECT THE POSITIVE LOCK® CONNECTORS TO THE TERMINALS, CONNECT THE POSITIVE LOCK® SO THAT THE LEVER FACE YOU (SERVICE ENGINEERS).

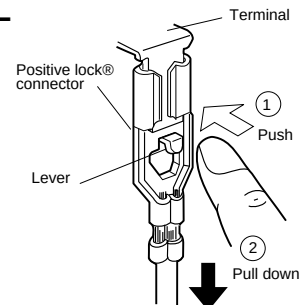


Figure C-2. Positive lock® connector

CONTROL PANEL ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect wire leads from panel components.
3. Release one (1) nail holding the control panel assembly to the oven flange.
4. Remove control panel assembly and slide upward.
5. Now, individual components can be removed.

NOTE: 1. Before attaching a new key sheet, remove remaining adhesive on the control panel frame

surfaces completely with a soft cloth soaked in alcohol.

2. When attaching the key sheet to the control panel frame, adjust the upper edge and right edge of the key sheet to the correct position of control panel frame.
3. Stick the key sheet firmly to the control panel frame by rubbing with soft cloth not to scratch.

TURNTABLE MOTOR REMOVAL

1. Disconnect oven from power supply.
2. Remove turntable and turntable support from oven cavity.
3. Lay the oven on it's backside. Remove the turntable motor cover by snipping off the material in four corner.
4. Where the corners have been snipped off bend corner areas flat. No sharp edge must be evident after removal of the turntable motor cover.
5. Disconnect wire leads from turntable motor.
(See "Positive lock connector removal")

6. Remove two (2) screws holding turntable motor to oven cavity.
7. Now the turntable motor is free.
8. After replacement use the one (1) screw to fit the turntable motor cover.

NOTE: The one (1) screw to fit the turntable motor cover should be XOTSD40P12000, XOTSD40P10000 or XOTSD40P08000.

COOLING FAN MOTOR REMOVAL

1. CARRY OUT 3D CHECKS.
 2. Disconnect the wire leads from the fan motor, thermal cut-out (FAN) and magnetron.
 3. Remove two (2) screws holding the chassis support to oven cavity front plate and magnetron. And remove chassis support.
 4. Remove two (2) screws holding the magnetron to waveguide flange. And remove the magnetron.
 5. Remove one (1) screw holding the fan duct assembly to oven cavity.
 6. Release the fan duct assembly from the oven cavity.
 7. Remove one (1) screw holding the thermal cut-out angle to the fan motor.
 8. Remove the fan blade from the fan motor shaft according the following procedure.
- 1) Hold the edge of the rotor of the fan motor by using a pair of grove joint pliers.

CAUTION:

- * **Make sure that any pieces do not enter the gap between the rotor and the stator of the fan motor because the rotor is easily shaven by pliers and metal pieces may be produced.**
 - * **Do not touch the pliers to the coil of the fan motor because the coil may be cut or injured.**
 - * **Do not disfigure the bracket by touching with the pliers.**
- 2) Remove the fan blade from the shaft of the fan motor by pulling and rotating the fan blade with your hand.
 - 3) Now, the fan blade will be free.

CAUTION:

- * **Do not use this removed fan blade again because the hole (for shaft) of it may become bigger than a standard one.**

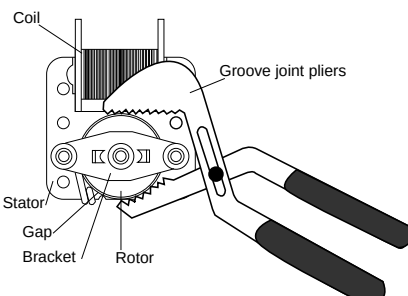
9. Remove the two (2) screws holding the fan motor to the fan duct.
10. Now, the fan motor is free.

INSTALLATION

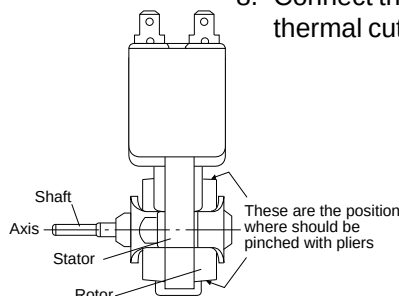
1. Install the fan motor to the fan duct with the two (2) screws.
 2. Install the fan blade to the fan motor shaft according the following procedure.
- 1) Hold the center of the bracket which supports the shaft of the fan motor on the flat table.
 - 2) Apply the screw lock tight into the hole (for shaft) of the fan blade.
 - 3) Install the fan blade to the shaft of fan motor by pushing the fan blade with a small, light weight, ball peen hammer or rubber mallet.

CAUTION:

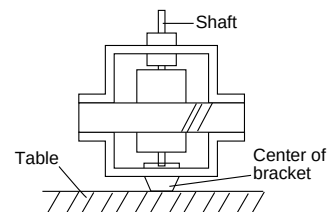
- * **Do not hit the fan blade strongly when installed because the bracket may be disfigured.**
 - * **Make sure that the fan blade rotates smooth after installation.**
 - * **Make sure that the axis of the shaft is not slanted.**
3. Install the thermal cut-out angle to the fan motor with one (1) screw.
 4. Catch two holes of fan duct on two tabs of the waveguide flange.
 5. Install the fan duct assembly to the oven cavity with the one (1) screw.
 6. Install the magnetron to waveguide flange with two (2) screws.
 7. Install one (1) tab of the chassis support to oven cavity front plate and install another tab of it to rear plate. And then screw chassis support to oven cavity front plate and magnetron with two (2) screws.
 8. Connect the wire leads to the fan motor, magnetron and thermal cut-out (FAN), referring to the pictorial diagram.



Rear View



Side View



OVEN LAMP AND LAMP SOCKET REMOVAL

1. CARRY OUT 3D CHECKS.
2. Pull the wire leads from the oven lamp socket by pushing the terminal hole of the oven lamp socket with the small flat type screw driver.
3. Bend the tab of the oven cavity holding the lamp socket.
4. Lift up the oven lamp socket.
5. Now, the oven lamp socket is free.

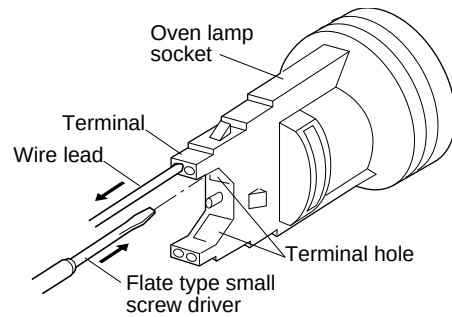


Figure C-3. Oven lamp socket

POWER SUPPLY CORD REPLACEMENT

Removal

1. CARRY OUT 3D CHECKS.
2. Remove the one (1) screw holding the green/yellow wire to the bottom plate right.
3. Disconnect the brown wire lead of the power supply cord from the fuse holder.
4. Cut away the connector.
5. Release the power supply cord from the rear cabinet.
6. Now, the power supply cord is free.

Re-install

1. Insert the moulding cord stopper of power supply cord into the square hole of the rear cabinet.
2. Install the earth wire lead of power supply cord to the bottom plate right with one (1) screw and tight the screw.
3. Connect the brown wire lead of power supply cord to the fuse holder correctly, referring to the Pictorial Diagram.
4. Strip the blue wire lead of the power supply cord and white wire lead of the main wire harness for 15mm length from their end.

5. Wind the conductor of the blue wire lead of the power supply cord and the conductor of the wire lead of the main wire harness each other.
6. Insert them into the connector. And clamp it.
7. CARRY OUT 4R CHECKS.

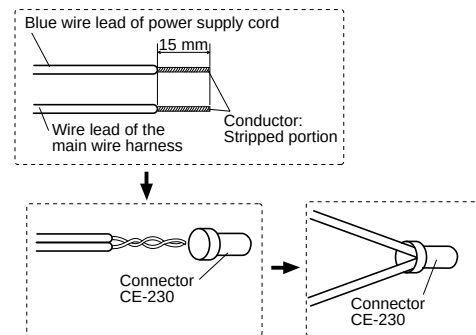


Figure C-4. Power supply cord replacement

1ST. LATCH SWITCH, 2ND. INTERLOCK RELAY CONTROL SWITCH AND MONITOR SWITCH REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect wire leads from the switches.
3. Remove two (2) screws holding latch hook to oven flange.
4. Remove latch hook assembly from oven flange.
5. Push outward on the two (2) retaining tabs holding each switch in place.
6. Switches are now free. At this time switch lever will be free, do not lose it.

Re-install

1. Re-install each switch and switch lever in its place.

The 1st. latch switch and monitor switch are in the lower position and 2nd. interlock relay control switch is in the upper position.

2. Re-connect wire leads to each switch. Refer to pictorial diagram.
3. Secure latch hook (with two (2) mounting screws) to oven flange.
4. Make sure that the monitor switch is operating properly and check continuity of the monitor circuit. Refer to chapter "Test Procedure" and Adjustment procedure.

1ST. LATCH SWITCH, 2ND. INTERLOCK RELAY CONTROL SWITCH AND MONITOR SWITCH

ADJUSTMENT

If each switch does not operate properly due to a misadjustment, the following adjustment should be made.

1. Loosen the two (2) screws holding latch hook to the oven

cavity front flange.

2. With door closed, adjust latch hook by moving it back and forth, and up and down. In and out play of the door allowed by the upper and lower position of the latch hook

should be less than 0.5mm. The vertical position of the latch hook should be adjusted so that the 1st. latch switch 2nd. interlock relay control switch are activated with the door closed. The horizontal position of the latch hook should be adjusted so that the monitor switch is activated with the door closed.

3. Secure the screws with washers firmly.
4. Check the operation of all switches. If any switch has not activated with the door closed, loosen screw and adjust the latch hook position.

After adjustment, check the following.

1. In and out play of door remains less than 0.5mm when in the latched position. First check upper position of latch hook, pushing and pulling upper portion of door toward the oven face. Then check lower portion of the latch hook, pushing and pulling lower portion of the door toward the oven face. Both results (play in the door) should be less than 0.5mm.
2. The 1st. latch switch and 2nd. interlock relay control switch interrupt the circuit before the door can be opened.

3. Monitor switch contacts close when door is opened.
4. Re-install outer case and check for microwave leakage around door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

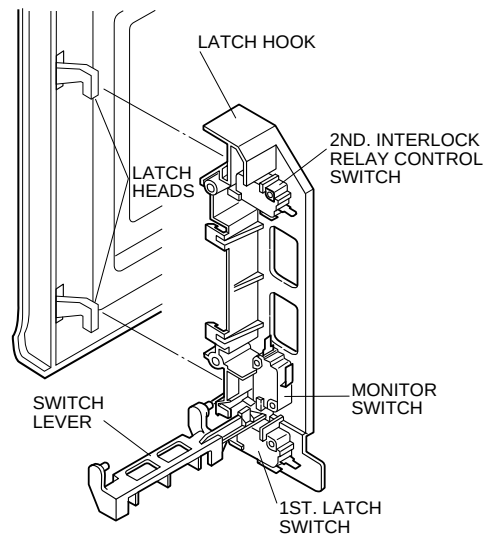


Figure C-5. Latch Switch Adjustments

DOOR REPLACEMENT

REMOVAL

1. Disconnect oven from power supply.
2. Push the open button and open the door slightly.
3. Insert an putty knife (thickness of about 0.5mm) into the gap between the choke cover and corner portion of door frame as shown Figure C-6 to free engaging parts.
4. Try the principles of the lever and lift up the choke cover by inserting a putty knife as shown Figure C-6.
5. Release choke cover from door panel.
6. Now choke cover is free.
7. Release two (2) pins of door panel from two (2) hole of upper and lower oven hinges by lifting up.
8. Now, door panel is free from oven cavity.
9. Remove the two (2) screws holding the door panel to the door frame.
10. Release door panel from nine (9) tabs of door frame by sliding door panel downward.
11. Now, door panel with sealer film is free.
12. Tear sealer film from door panel.
13. Now, door panel is free.
14. Slide latch head upward and remove it from door frame with releasing latch spring from door frame and latch head.
15. Now, latch head and latch spring are free.
16. Remove door screen from door frame by releasing two (2) tabs.
17. Now, door screen is free.

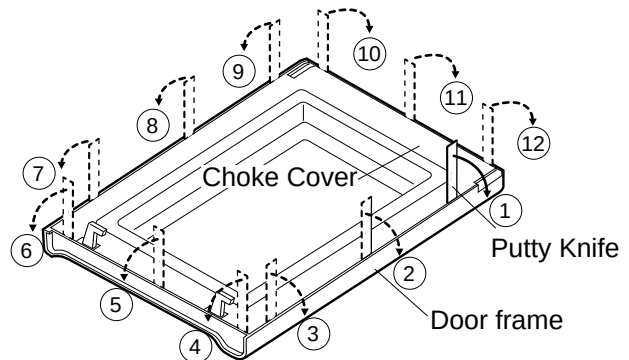


Figure C-6. Door Disassembly

RE-INSTALL

1. Re-install door screen to door frame by fitting two (2) tabs of door frame to two (2) holes of door screen.
2. Re-install latch spring to the head. Re-install latch spring to the door frame. Re-install latch head to the door frame.
3. Re-install door panel to door frame by fitting nine (9) tabs of door frame to nine (9) holes of door panel.
4. Hold the door panel to the door frame with two (2) screws.
5. Put sealer film on door panel. Refer to "Sealer Film" about how to handle new one.
6. Catch two (2) pins of door panel on two (2) hole of upper and lower oven hinges.
7. Re-install choke cover to door panel by pushing.

Note: After any service to the door;

- (A) Make sure that door sensing switch and secondary interlock switch are operating properly. (Refer to chapter "Test Procedures").**
- (B) An approved microwave survey meter should be used to assure compliance with proper microwave radiation emission limitation standards.**

After any service, make sure of the following :

1. Door latch heads smoothly catch latch hook through latch holes and that latch head goes through center of latch hole.
2. Deviation of door alignment from horizontal line of cavity face plate is to be less than 1.0mm.
3. Door is positioned with its face pressed toward cavity face plate.
4. Check for microwave leakage around door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

Note: The door on a microwave oven is designed to act as an electronic seal preventing the leakage of microwave energy from oven cavity during cook cycle. This function does not require that door be air-tight, moisture (condensation)-tight or light-tight. Therefore, occasional appearance of moisture, light or sensing of gentle warm air movement around oven door is not abnormal and do not of themselves, indicate a leakage of microwave energy from oven cavity.

SEALER FILM

Installation

1. Put the adhesive tape on the backing film of the sealer film as shown in Fig. C-8.
2. Tear the backing film by pulling the adhesive tape.
3. Put the pasted side of the sealer film on the door panel

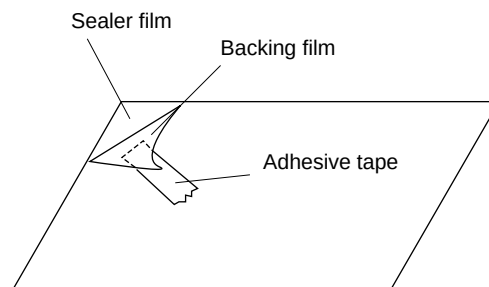


Figure C-8. Sealer film

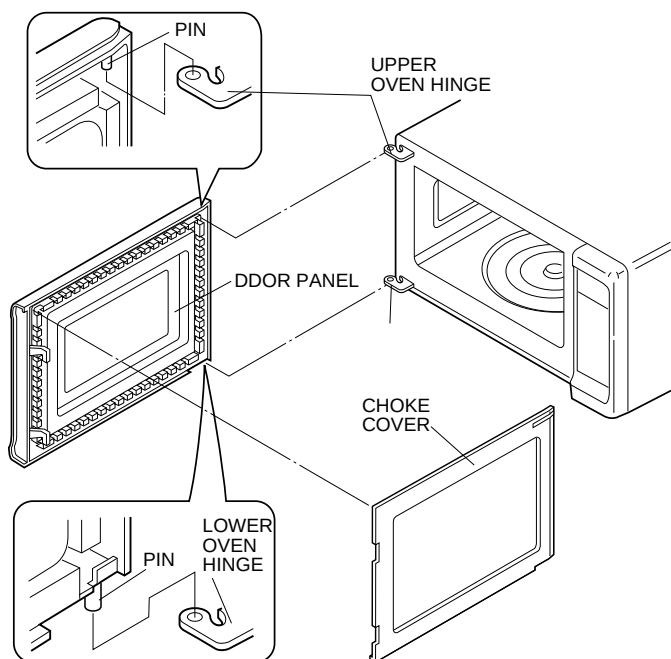


Figure C-7. Door Replacement

MICROWAVE MEASUREMENT

After adjustment of door latch switches, monitor switch and door are completed individually or collectively, the following leakage test must be performed with a survey instrument and it must be confirmed that the result meets the requirements of the performance standard for microwave oven.

REQUIREMENT

The safety switch must prevent microwave radiation emission in excess of $5\text{mW}/\text{cm}^2$ at any point 5cm or more from external surface of the oven.

PREPARATION FOR TESTING:

Before beginning the actual test for leakage, proceed as follows;

1. Make sure that the test instrument is operating normally as specified in its instruction booklet.

Important:

Survey instruments that comply with the requirement for instrumentations as prescribed by the performance standard for microwave ovens must be used for testing.

Recommended instruments are:

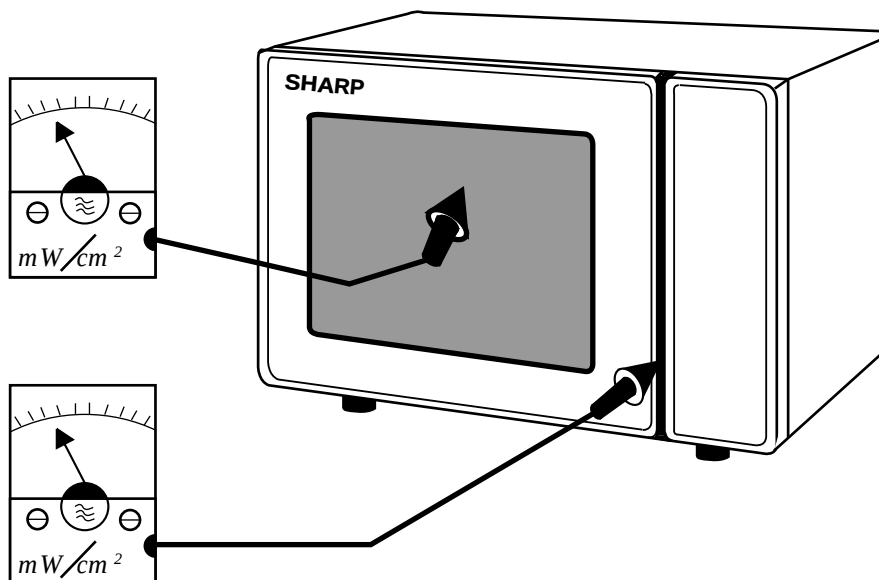
NARDA 8100

NARDA 8200

HOLADAY HI 1500

SIMPSON 380M

2. Place the oven tray into the oven cavity.
3. Place the load of $275 \pm 15\text{ml}$ of water initially at $20 \pm 5^\circ\text{C}$ in the centre of the oven tray. The water container should be a low form of 600 ml beaker with inside diameter of approx. 8.5cm and made of an electrically non-conductive material such as glass or plastic. The placing of this standard load in the oven is important not only to protect the oven, but also to insure that any leakage is measured accurately.
4. Close the door and turn the oven ON with the timer set for several minutes. If the water begins to boil before the survey is completed, replace it with 275ml of cool water.
5. Move the probe slowly (not faster than $2.5\text{cm}/\text{sec.}$) along the gap.
6. The microwave radiation emission should be measured at any point of 5cm or more from the external surface of the oven.



Microwave leakage measurement at 5 cm distance

SCHEMATIC

NOTE: CONDITION OF OVEN

1. DOOR CLOSED
2. CLOCK APPEARS ON DISPLAY

NOTE: "★" indicates components with potentials above 250V.

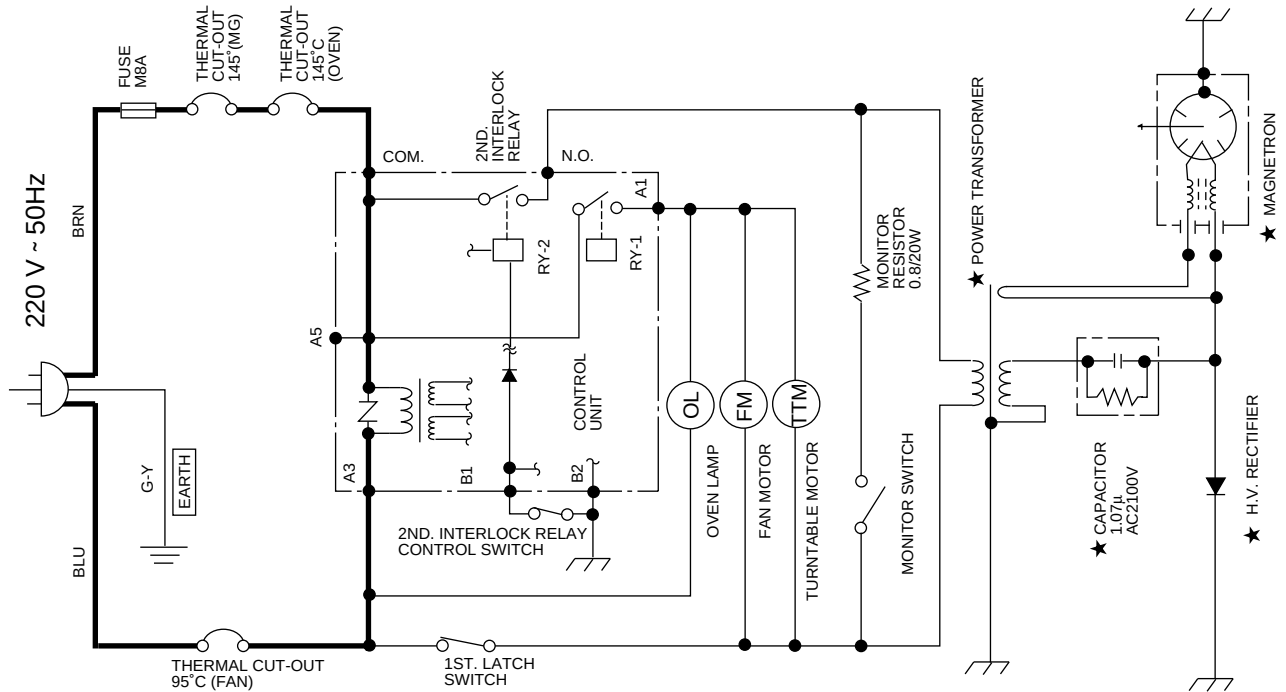


Figure O-1. Oven Schematic-OFF Condition

SCHEMATIC

NOTE: CONDITION OF OVEN

1. DOOR CLOSED
2. COOKING TIME PROGRAMMED
3. START KEY TOUCHED

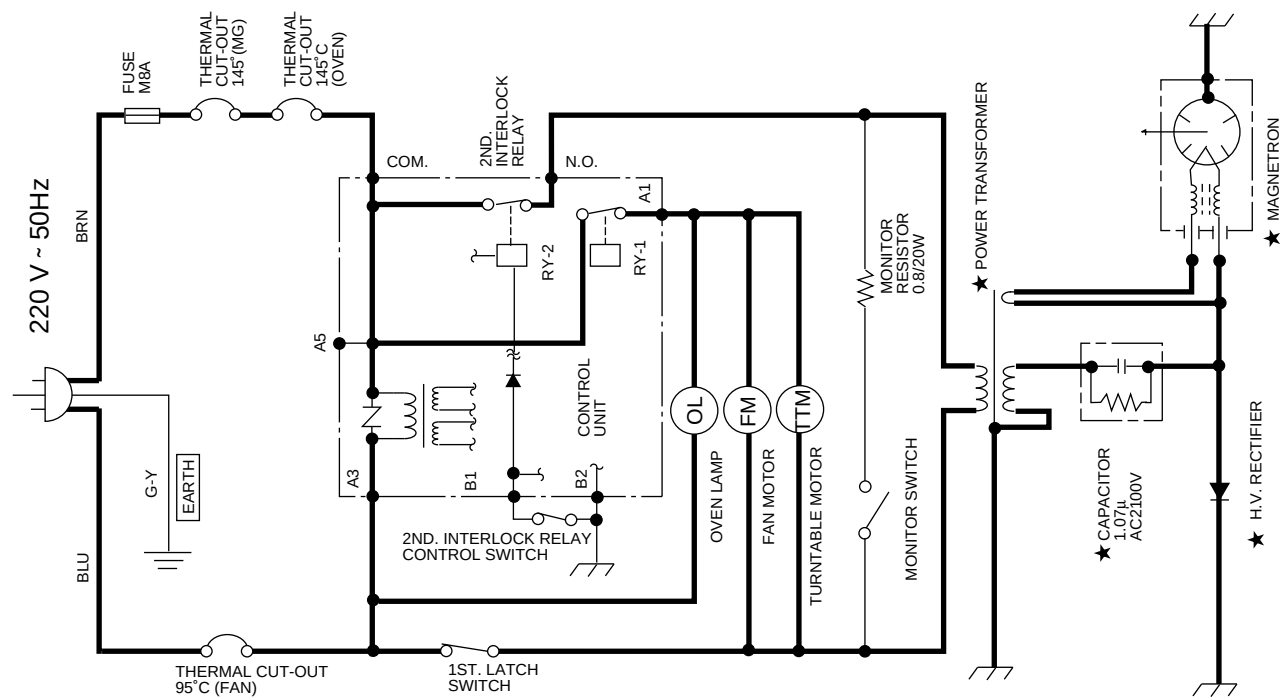
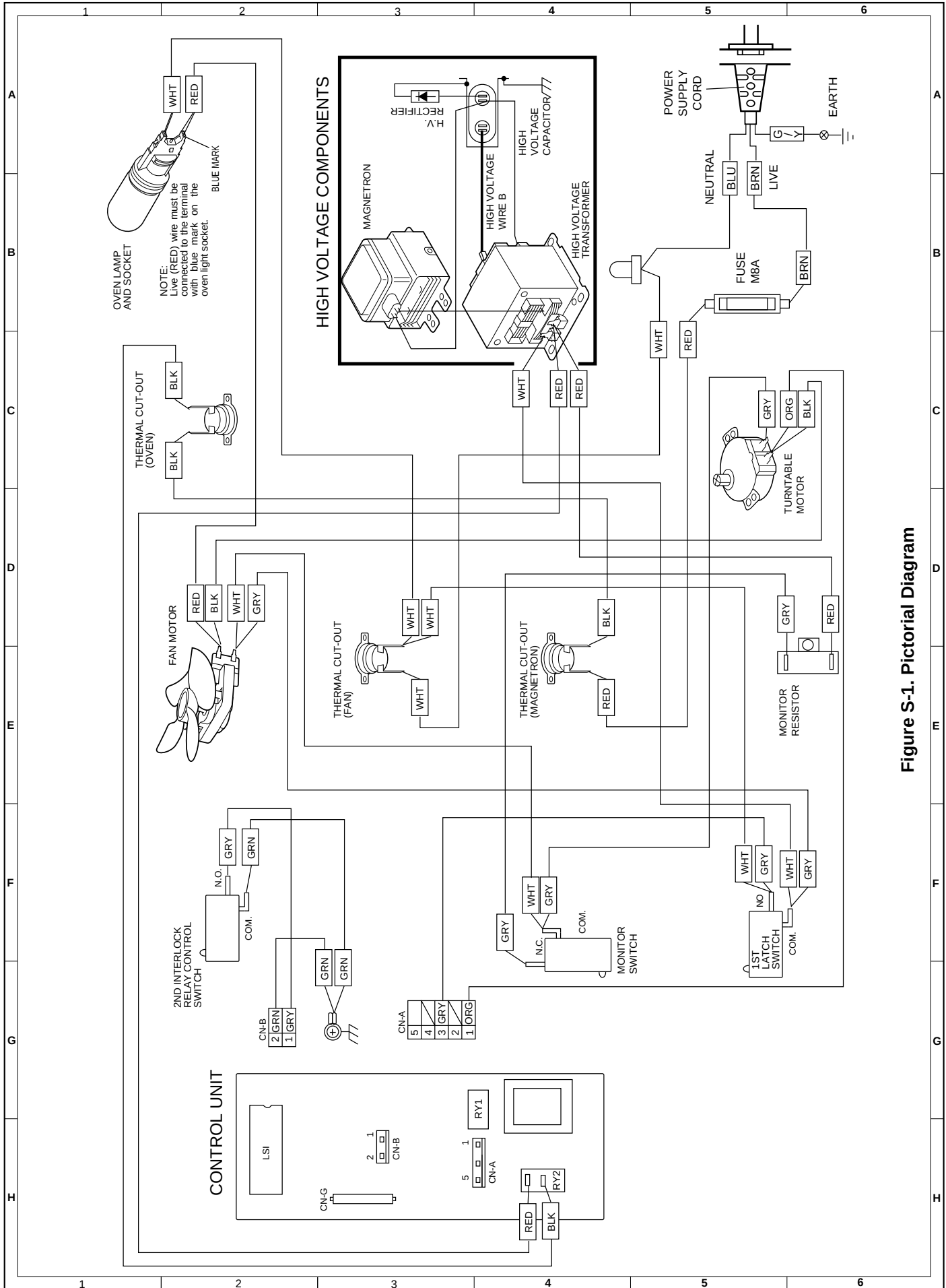


Figure O-2. Oven Schematic-Cooking Condition





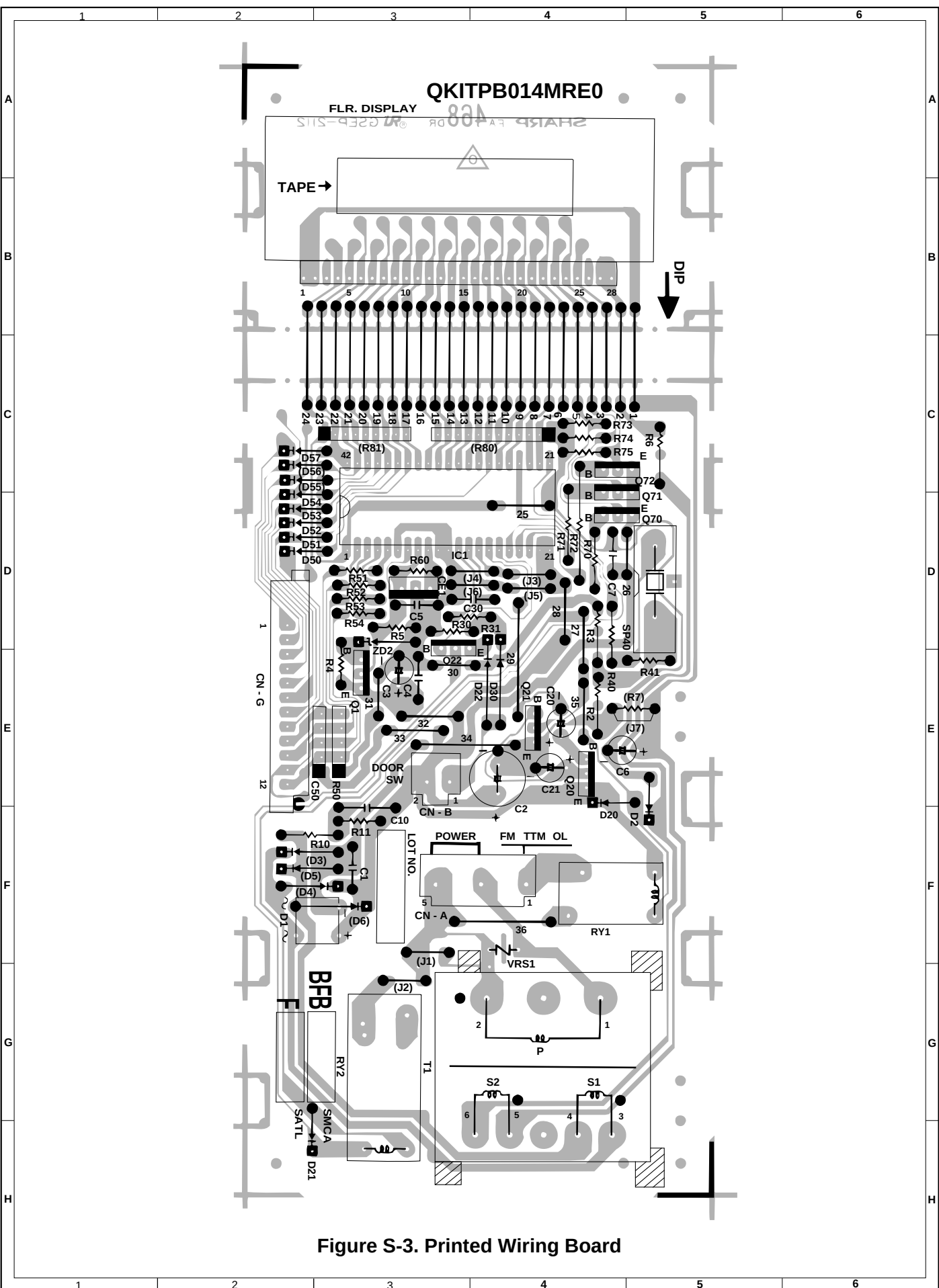


Figure S-3. Printed Wiring Board

PARTS LIST

Note: The parts marked "Δ" may cause undue microwave exposure.

The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
ELECTRICAL PARTS				
Δ *	1- 1	QSW-MA110WRE0 1st. latch and 2nd. Iinterlock relay control switches	2	AK
	1- 2	QSW-MA111WRE0 Monitor switch	1	AK
	1- 3	RV-MZA197WRE0 Magnetron	1	BN
	1- 4	RTHM-A080WRE0 Thermal cut-out 145°C	2	AP
*	1- 5	FH-DZA047WRK0 High voltage rectifier assambly	1	AQ
*	1- 6	RC-QZA172WRE0 High voltage capacitor	1	AY
	1- 7	RMOTEA265WRE0 Cooling fan motor	1	AZ
	1- 8	RTHM-A072WRE0 Thermal cut-out 95°C	1	AM
	1- 9	QACC-A065WRE0 Power supply cord	1	AS
	1-10	QFS-CA010WRE0 Fuse (M8A)	1	AE
	1-11	QFSHDA019WRE0 Fuse holder	1	AH
	1-12	QSOCLA022WRE0 Oven lamp socket	1	AG
	1-13	RLMPTA069WRE0 Oven lamp	1	AK
	1-14	RMOTDA169WRE0 Turntable motor	1	AW
	1-15	RR-WZA003WRE0 Monitor resistor 0.8Ω 20W	1	AG
*	1-16	RTRN-A480WRE0 Power transformer	1	BP
	1-17	QPLGAA018WRE0 AC plug	1	AL
CABINET PARTS				
	2- 1	GCABUA522WRT0 Outer case cabinet	1	AT
	2- 2	FDAI-A171WRY0 Bottom plate right	1	AT
	2- 3	GDAI-A261WRW0 Bottom plate left	1	AP
	2- 4	GLEGPA019WRE0 Foot	4	AD
CONTROL PANEL PARTS				
	3- 1	CPWBFA684WRK0 Control unit	1	BM
	3- 1A	QCNCMA234DRE0 3-pin connector (CN-A)	1	AC
	3- 1B	QCNCMA275DRE0 2-pin connector (CN-B)	1	AB
	3- 1C	QCNCWA057DRE0 12-pin connector (CN-G)	1	AF
	3- 1D	RV-KXA069DRE0 Fluorescent display tube	1	AX
	C1	RC-KZA132DRE0 Capacitor 0.1uF 50V	1	AC
	C2	VCEAB31VW337M Capacitor 330uF 35V	1	AC
	C3	VCEAB31CW476M Capacitor 47uF 16V	1	AA
	C4-5	VCKYD11CY103N Capacitor 0.01uF 16V	2	AH
	C6	VCEAB31CW476M Capacitor 47uF 16V	1	AA
	C7	RC-KZA132DRE0 Capacitor 0.1uF 50V	1	AC
	C10	VCKYB11EX103N Capacitor 0.01uF 25V	1	AA
	C20	VCEAB31HW104M Capacitor 0.1uF 50V	1	AB
	C21	VCEAB31VW106M Capacitor 10uF 35V	1	AB
	C30	VCKYD11CY103N Capacitor 0.01uF 16V	1	AH
	C50	RMPTEA009DRE0 Capacitor array 330pF x 4	1	AE
	CF1	RCRS-A012DRE0 Ceramic resonator (CST4.00MGW)	1	AD
	D1	RSRCD A013DRE0 Diode bridge (S1NB10)	1	AG
	D2	VHD1SS270A/-1 Diode (1SS270ATA)	1	AA
	D20-22	VHD1SS270A/-1 Diode (1SS270ATA)	3	AA
	D30	VHD1SS270A/-1 Diode (1SS270ATA)	1	AA
	D50-56	VHD1SS270A/-1 Diode (1SS270ATA)	7	AA
	IC1	RH-IZA683DRE0 LSI	1	AU
	Q1	VS2SA933S/-3 Transistor (2SA933S)	1	AB
	Q20	VSKRA101M/-3 Transistor (KRA101M)	1	AB
	Q21	VSKRC243M/-3 Transistor (KRC243M)	1	AB
	Q22	VSDTA143ES/1B Transistor (DTA143ES)	1	AB
	Q70-72	VS2SA933S/-3 Transistor (2SA933S)	3	AB
	R2-3	VRD-B12HF821J Resistor 820 ohm 1/2W	2	AD
	R4	VRD-B12EF102J Resistor 1.0k ohm 1/4W	1	AA
	R5	VRD-B12EF472J Resistor 4.7k ohm 1/4W	1	AA
	R6	VRD-B12HF120J Resistor 12 ohm 1/2W	1	AB
	R7	VRD-B12EF151J Resistor 150 ohm 1/4W	1	AA
	R10	VRD-B12EF473J Resistor 47k ohm 1/4W	1	AA
	R11	VRD-B12EF563J Resistor 56k ohm 1/4W	1	AA
	R30	VRD-B12EF153J Resistor 15k ohm 1/4W	1	AA
	R31	VRD-B12EF472J Resistor 4.7k ohm 1/4W	1	AA
	R40	VRD-B12EF102J Resistor 1.0k ohm 1/4W	1	AA
	R41	VRD-B12EF332J Resistor 3.3k ohm 1/4W	1	AA
	R50	RR-DZA143DRE0 Resistor array 150k ohm x 4	1	AC
	R51-54	VRD-B12EF153J Resistor 15k ohm 1/4W	4	AA
	R60	VRD-B12EF105J Resistor 1M ohm 1/4W	1	AA
	R70-72	VRD-B12EF472J Resistor 4.7k ohm 1/4W	3	AA
	R73-75	VRD-B12EF104J Resistor 100k ohm 1/4W	3	AA
	(J27)	VRD-B12EF151J Resistor 150 ohm 1/4W	1	AA

Note: The parts marked "Δ" may cause undue microwave exposure.
The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
(J35)	VRD-B12EF511J	Resistor 510 ohm 1/4W	1	AA
RY1	RRLY-A080DRE0	Relay (OJ-SS-124LM)	1	AG
RY2	RRLY-A076DRE0	Relay (OMIF-S-124LM)	1	AK
SP40	RALM-A014DRE0	Buzzer (PKM22EPT-THAI)	1	AG
T1	RTRNPA098DRE0	Transformer	1	AT
VRS1	RH-VZA032DRE0	Varistor (10G471K)	1	AE
ZD2	VHEHZ4C3///-1	Zener diode (HZ4C-3)	1	AA
3- 2	FPNLCA225WRK0	Control panel frame with key unit	1	AZ
3- 2-1	FUNTKA753WRE0	Key unit	1	AV
3- 3	JBTN-A927WRF0	Open button	1	AF
3- 4	MSPRCA050WRE0	Open button spring	1	AB
3- 5	XEPSD30P08XS0	Screw : 3mm x 8mm	2	AA

OVEN PARTS

Δ	4- 1	PHOK-A095WRF0	Latch hook	1	AN
	4- 2	LBNDKA095WRP0	Capacitor holder	1	AM
	4- 3	NFANJA029WRE0	Fan blade	1	AL
	4- 4	PDUC-A599WRP0	Fan duct	1	AK
Δ	4- 5	FOVN-A333WRT0	Oven cavity	1	BD
	4- 6	LANGFA171WRP0	Chassis support	1	AG
	4- 7	MLEVPA194WRF0	Switch lever	1	AG
	4- 8	NCPL-A045WRF0	Coupling	1	AH
	4- 9	PCOVPA275WRE0	Waveguide cover	1	AR
	4-10	PCUSGA339WRP0	Cushion	1	AG
	4-11	PCUSUA329WRP0	Cushion	1	AC
	4-12	PDUC-A597WRF0	Air guide	1	AG
	4-13	PFILWA041WRE0	Lamp filter	1	AF
	4-14	PPACGA084WRF0	TTM packing	1	AF
	4-15	LANGQA368WRP0	Fuse angle	1	AL
	4-16	LANGQA343WRP0	Thermal cut-out (Fan) mounting angle	1	AK
	4-17	PCUSGA378WRP0	Cushion	1	AL
	4-18	PCUSGA388WRP0	Cushion	1	AK
	4-19	PCUSUA278WRP0	Cushion	1	AC

DOOR PARTS

Δ	5- 1	FDORFA283WRT0	Door panel	1	AY
	5- 2	PSHEPA382WRE0	Sealer film	1	AH
	5- 3	GCOVHA342WRF0	Choke cover	1	AM
Δ	5- 4	GWAKPA354WRF0	Door frame	1	AN
	5- 5	HPNL-A657WRR0	Door screen	1	AT
Δ	5- 6	LSTPPA139WRF0	Latch head	1	AF
	5- 7	MSPRTA084WRE0	Latch spring	1	AB
	5- 8	XCPSD40P06000	Screw; 4mm x 6mm	2	AA

MISCELLANEOUS

	6- 1	FROLPA057WRK0	Roller stay	1	AQ
	6- 2	NTNT-A051WRE0	Turntable tray	1	AR
	6- 3	TINS-A568WRR0	Operation manual (English)	1	AQ
	6- 4	FW-VZB045WRE0	Switch harness	1	AH
	6- 5	FW-VZB494WRE0	Main wire harness	1	AW
*	6- 6	QW-QZA150WRE0	High voltage wire B	1	AF
	6- 7	LHLDWA011WRE0	Purse lock "M"	1	AB
	6- 8	TCAUHA214WRR0	Caution label	1	AC
	6- 9	PSHE-A069WRR0	Menu label	1	AM
	6-10	TSPCNC326WRR0	Name plate	1	AE
	6-11	PZET-A012WRE0	Terminal insulator	1	AB
	6-12	QTANP0020YBE0	Connector	1	AA
	6-13	TCADCA565WRR0	Cook book (Thai)	1	AZ
	6-14	QW-QZA177WRE0	Earth wire	1	AK
	6-15	TLABPA032WRR0	Grounding label	1	AG
	6-16	TINS-A567WRR0	Operation manual (Thai)	1	AQ

SCREWS,NUTS AND WASHERS

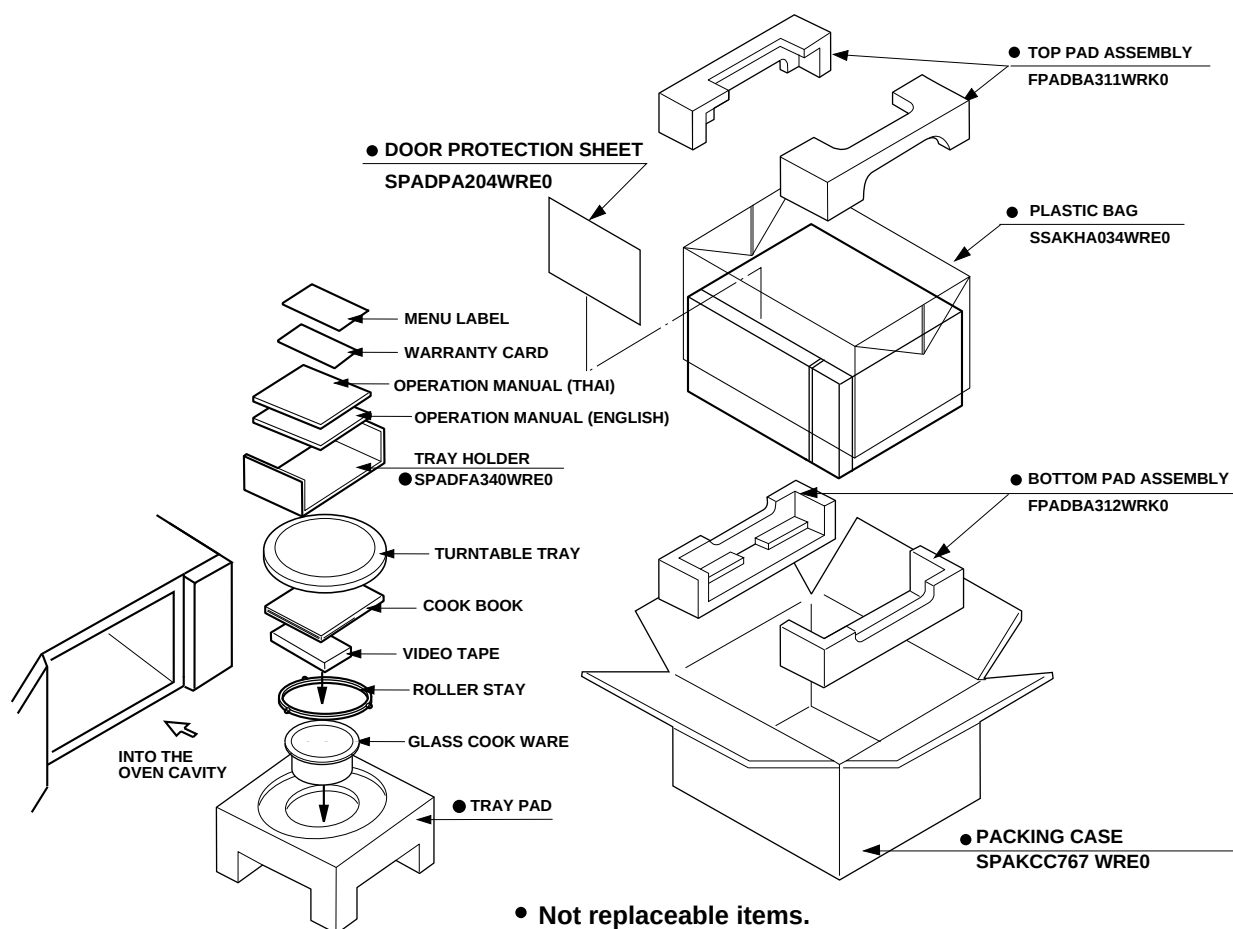
	7- 1	XFPSD40P08K00	Screw : 4mm x 8mm	9	AA
	7- 2	XFPSD30P06000	Screw : 3mm x 6mm	2	AA
	7- 3	XHTSD40P08RV0	Screw : 4mm x 8mm	3	AA
	7- 4	XHTSD40P08000	Screw; 4mm x 8mm	1	AA
	7- 5	XOTSD40P12RV0	Screw : 4mm x 12mm	14	AA
	7- 6	XOTSD40P12000	Screw : 4mm x 12mm	9	AA
	7- 7	XVPSD40P20000	Screw; 4mm x 20mm	1	AA
	7- 8	XFPSD30P10000	Screw; 3mm x 10mm	1	AA

HOW TO ORDER REPLACEMENT PARTS

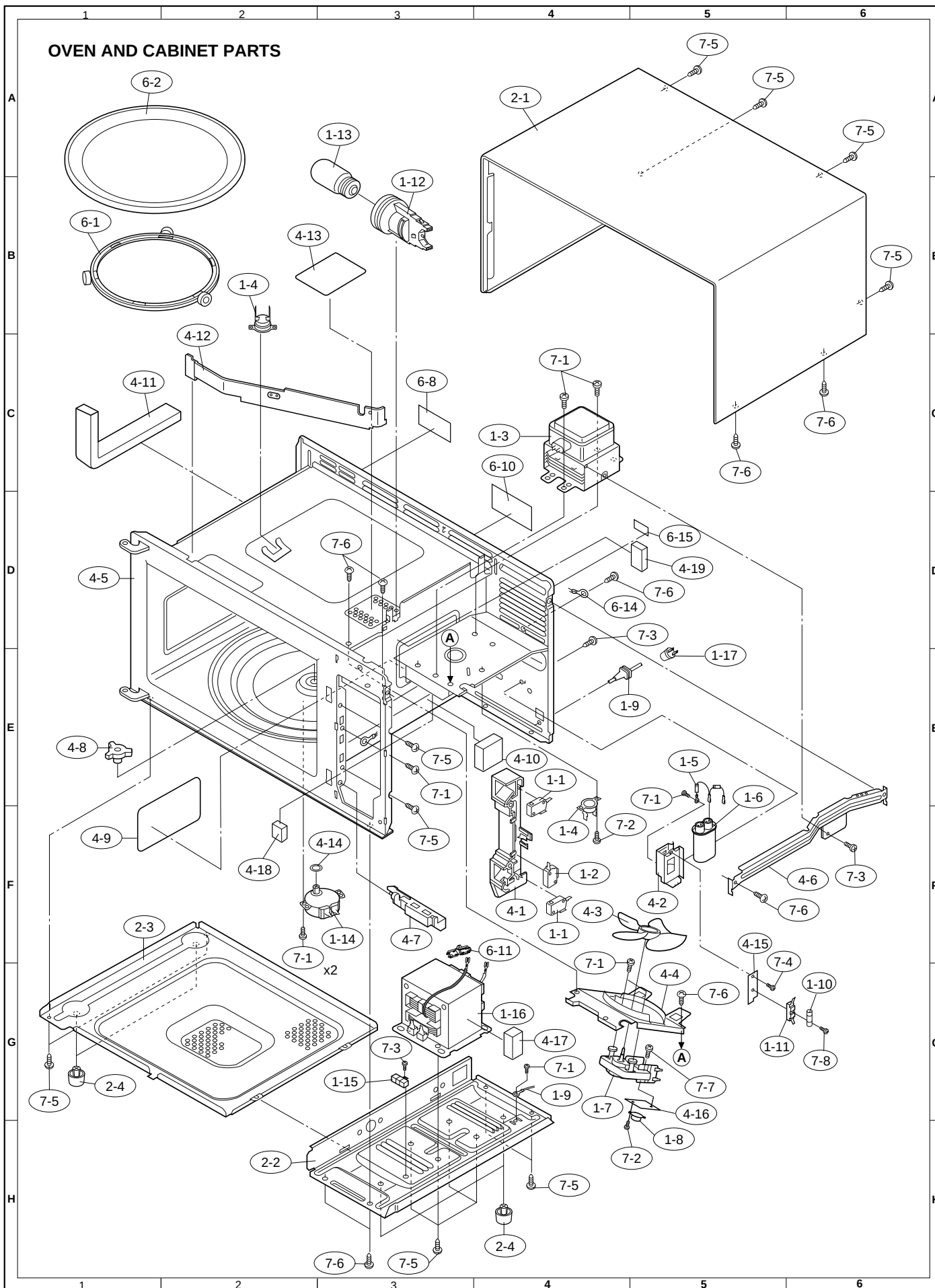
To have your order filled promptly and correctly, please furnish the following information.

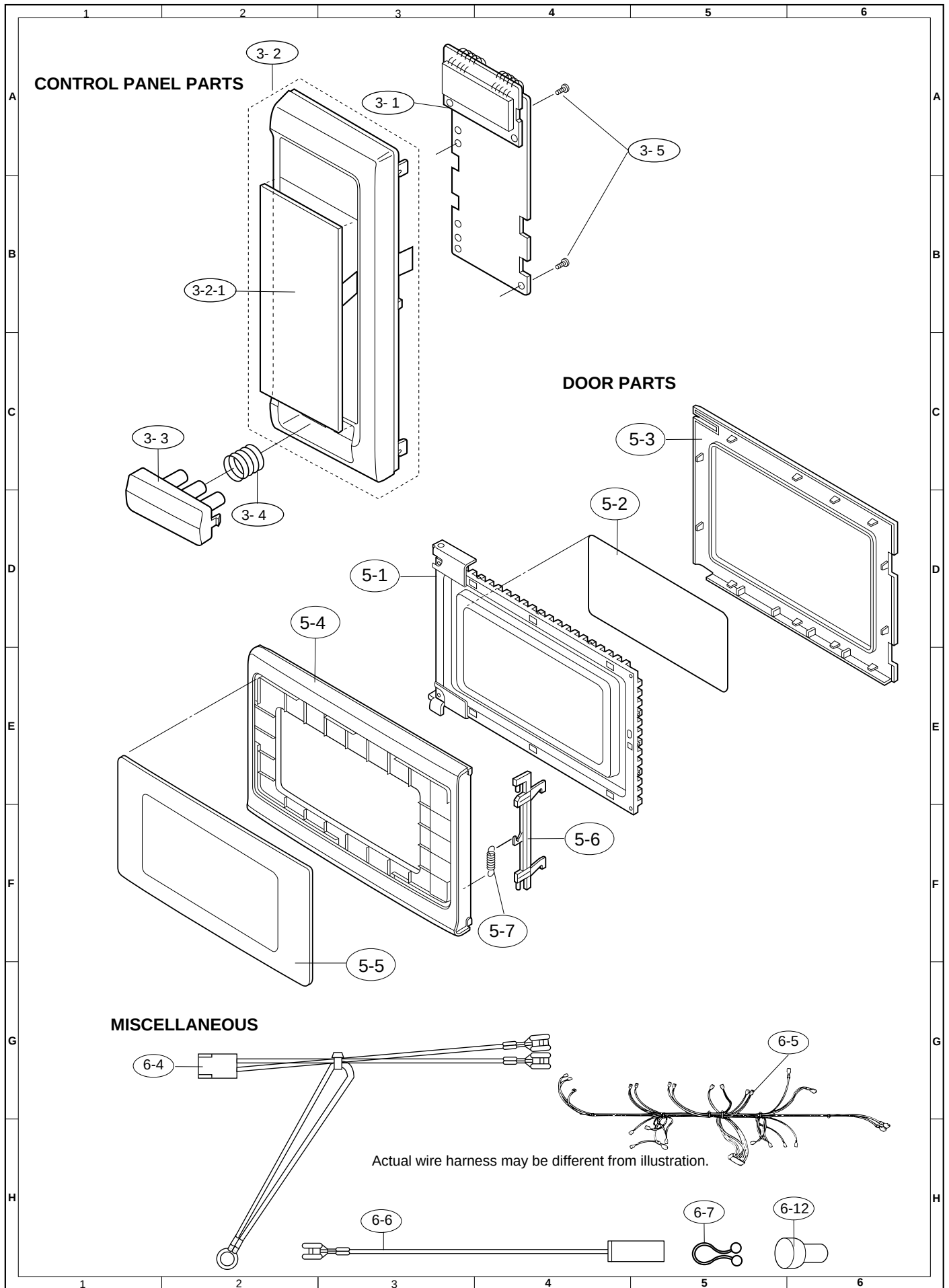
- | | |
|-----------------|----------------|
| 1. MODEL NUMBER | 2. REF. NO. |
| 3. PART NO. | 4. DESCRIPTION |

PACKING AND ACCESSORIES



OVEN AND CABINET PARTS





SHARP